ORDER

6330.4

AIRPORT SURFACE DETECTION
EQUIPMENT
ASDE-3
PROJECT IMPLEMENTATION PLAN

April 10, 1991

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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RECORD OF CHANGES

DIRECTIVE NO. 6330.4

CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL USE	CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL USE

FOREWORD

This order transmits the project implementation plan for the ASDE-3. It provides guidance and direction for the orderly implementation of the ASDE-3. The procedures and reponsibilities of this project were developed within the bounds of FAA directives for the ASDE-3 project. This order establishes program management, project implementation policy, and responsibilities governing the activities of organizations and also identifies and describes specific events and activities to be accomplished in order to implement the ASDE-3 project.

Carey L. Weigel
Program Director for Surveillance

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CHAPTER 1. GENERAL

1. PURPOSE. This order provides the overall guidance and direction for the orderly implementation of the Airport Surface Detection Equipment - Model 3 (ASDE-3). This Project Implementation Plan (PIP) establishes program management, project implementation policy, and responsibilities governing the activities of specified organizations. This PIP also identifies and defines the specific events and activities to be accomplished in order to successfully implement the ASDE-3. Each region can use the data contained within the PIP to develop a regional ASDE-3 implementation plan, which specifically, and at a much lower level of detail, addresses the implementation requirements for that region.

2. DISTRIBUTION. This order is being distributed at branch level to the offices of the Program Director for Surveillance, and Program Manager for Advanced Automation; NAS System Engineering, Systems Maintenance, and Air Traffic Plans and Requirements Services; branch level to the Engineering, Test, and Evaluation Service at the FAA Technical Center and the FAA Academy and the FAA Logistics Center at the Mike Monroney Aeronautical Center; branch level to the regional Airway Facilities divisions; and limited, distribution to all Air Traffic field offices.

3. DEFINITIONS. The terms, abbreviations, and acronyms used throughout this order are defined in appendix 1.

4. AUTHORITY TO CHANGE THIS ORDER. This order may be changed only by the Program Director for Surveillance, ANR-1. Requests for changes to this PIP should be directed to the ASDE-3 Program Manager, ANR-200, FAA Headquarters, 800 Independence Avenue, S.W., Washington, D.C. 20591. Deviations from this order must be approved by ANR-1.

5.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The ASDE-3 arose in response to National Airspace System (NAS) Plan objectives to provide improved surveillance of aircraft and airport service vehicles on the airport surface at high-activity airports. Satisfying this NAS Plan objective required the development of unique electronic and software technologies and their implementation in the ASDE-3. The ASDE-3 will provide the air traffic control tower (ATCT) controllers the capability to locate and track ground traffic on all airport movement areas in various types of weather conditions.

21. PURPOSE. The ASDE-3 is a ground search radar surveillance, acquisition, processing and display system. Its purpose is to provide tower controllers with real-time, high-resolution displays on the locations of surface traffic on all movement areas within the airport ground control area. Controllers will use this information to control the movement of aircraft (A/C) and authorized vehicles on the surface of the airport. This includes the movement of aircraft in takeoff or landing and aircraft taxiing to or from the terminal push-back area.

22. HISTORY. There are presently twelve vacuum tube type ASDE-2 operational subsystems in the NAS. These systems marginally improve the detection of aircraft in inclement weather. The ASDE-2 radar subsystems were procured from Airborne Instruments Laboratory and deployed in 1958-1960 time period. Improvements and equipment modifications to the existing systems have not improved on the 200-hour Mean Time Between Failure (MTBF) or corrected the basic radar performance limitations (e.g., image breakup of A/C targets (white-out), evident in heavy precipitation). The radar operating frequency (24 GHz) is characteristically absorbed and deflected by precipitation resulting in a cluttered plan view display (PVD). Target detection of aircraft and service vehicles is difficult to resolve on those cluttered displays. Thirty new improved ASDE-3 systems are being procured to replace the existing twelve vacuum tube-type ASDE-2's, the engineering model ASDE-3 in Anchorage, Alaska, 16 newly established operational sites, and one located at the FAA Aeronautical Center in Oklahoma City. In 1985, the FAA awarded the ASDE-3 turnkey contract, DTFA01-85-C-00054, to United Technologies, Norden Systems, Melville, N.Y.; Norden Systems is hereinafter referred to as the contractor.

Factory acceptance testing was completed in December 1989 with operational site deliveries scheduled to begin later (approximately March 1992) at the conclusion of the field test and evaluation (FT&E).

23.-29. RESERVED.

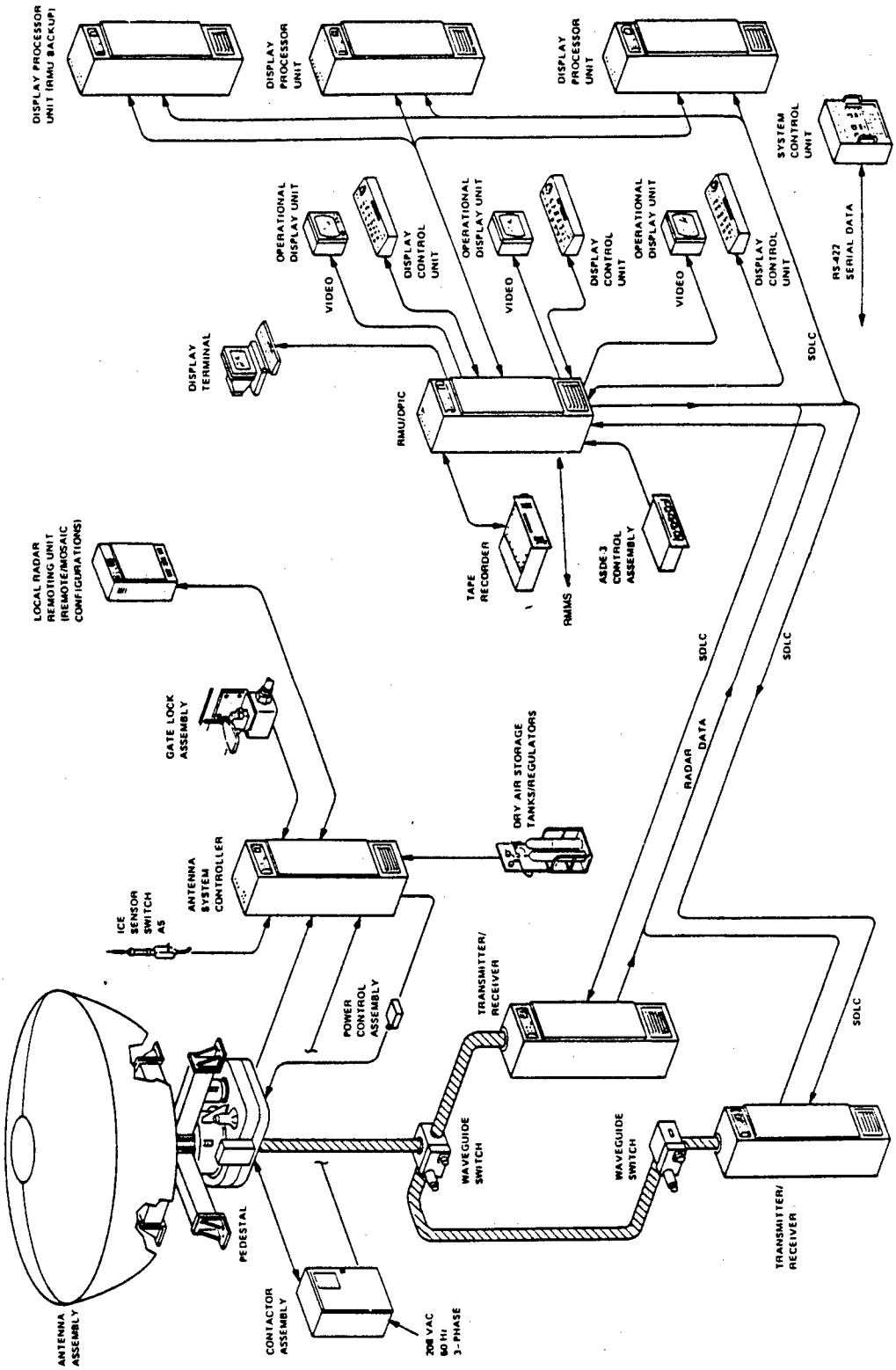
CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. The ASDE-3 is a high-resolution, clutter-free airport surface detection and mapping system which will expedite aircraft flow during restricted visibility conditions. Figure 3-1, ASDE-3 Local Tower Cab Functional Configuration, depicts a simplified system block diagram. It is a highly redundant system to ensure maximum availability. Surveillance information in rhotheta coordinates will be digitally converted to rectilinear coordinates and transmitted over television-type communications circuits to bright displays at local and ground controller positions located in the air traffic control tower (ATCT). It provides flexibility to the controller by displaying a map overlay of the airport, allowing zooming, windowing, offsetting, and rotation; permitting different threshold levels to be set for runways, taxiways, and grass areas; and allowing the controller to select the intensity and length of aircraft trails displayed. The controller will have independent control of the ASDE-3 display presentation, with the means to store and recover 100 display and map sets (range scale, offset, windows, map, target trail, etc.). The role of the ASDE is to provide surface surveillance to a range of 24,000 feet for the tower controllers. Therefore, the radar must be located in a position providing line of sight to all airport movement surfaces. If there are structural limitations, or siting considerations, that preclude installation of the antenna on the control tower, the ASDE-3 can be configured to allow remote operation from a fixed tower located away from the control tower. The major ASDE-3 subsystems are as follows:

a. Antenna Subsystem. The antenna subsystem will transmit and receive radiofrequency (RF) pulse energy and supply appropriate azimuthal direction information. The ASDE-3 radar antenna consists of two major subassemblies, the rotodome and its pedestal.

(1) Rotodome. The conventional radar directional antenna is a horn fed parabolical surface reflector that mechanically rotates in azimuth through the area of surveillance and is usually enclosed in a fixed radome for weather protection. However, the ASDE-3 has a combined antenna and radome assembly as an integral rotating radome (rotodome) that rotates as a unit and is symmetrical about its rotation axis when viewed externally. It is about 6 feet in height, and is approximately 18 feet in diameter. The total weight of the pedestal and rotodome is approximately 4,900 pounds. Inside the rotodome are the antenna RF components and heaters to prevent accumulation of ice on its surface.

FIGURE 3-1. ASDE-3 Local Tower Cab Functional Configuration



(2) Pedestal. The pedestal houses the rotodome drive mechanism, azimuth data generator, RF rotary joint/slip ring assembly and other electromechanical components. The pedestal is 4.5 feet in height. This includes 17.5 inches of pedestal turntable height at the interface between the stationary pedestal/tower structure and the rotodome bottom.

b. Dual Transmitter/Receiver Subsystem. The transmitter has a frequency agile Ku-band traveling-wave tube. The transmitters frequency and pulse repetition frequency (PRF) are synchronized to antenna position. Three kilowatt pulses are transmitted in a sequential frequency agility pattern (16 frequencies maximum) and delivered to the antenna. Radar return signals are routed back from the antenna via waveguide to the receiver where they are amplified, down-converted, bandwidth limited and detected. The receiver is microprocessor controlled for adaptive threshold-level settings of various areas: aircraft movement areas, abutting areas and all remaining areas. The superheterodyne radar receiver will receive and demodulate the "skin" reflection return pulses and output this as video information. The scan converter will convert radar video into television format with a refresh rate suitable for a display to be used in the high ambient light present in a tower. The transmitter/receiver/scan converter element will also perform fault detection, transmitter overload protection, and signal monitoring. Radar control circuits will generate the proper signals for antenna control, radar system control, and maintenance functions. Also, a map of the airport area will be generated and registered to the radar video for input to the tower display(s).

c. Display Processor and Interface Control Subsystem. The Display Processor Unit (DPU) includes operational displays, display control units, map storage and control units. The displays will be high-resolution, high-contrast and high-brightness displays.

d. Remote Maintenance Subsystem. The Remote Maintenance Subsystem (RMS) will monitor various maintenance and performance parameters and respond to maintenance control commands in support of the Remote Maintenance Monitoring System (RMMS).

e. Map Preparation Subsystem. The Map Preparation Subsystem is located at a central map preparation's facility where it is used to create basic map sets for use at the various ASDE-3 sites. It provides for conversion of cartographic data to digital format for transport on floppy disk to the user site location. These basic map sets are stored on standard 3.5-inch floppy disks and delivered to individual ASDE-3 sites. Map

preparation subsystem circuitry is identical to the system and video processor sections of the DPU and a portion of the Display Processor Interface Control Unit (DPIC).

f. Fixed Target Reflectors. The fixed target reflector is a passive dihedral (essentially an angle bracket) with 8- x 8cm sides, mounted on a frangible pole whose height shall not exceed 8 feet. These reflectors provide map registration (system alignment) reference points, reference points for adaptive threshold purposes (automatic receiver compensation for weather conditions), and monitoring/calibration of system coverage/ performance. Airport size and runway configuration determines the number of reflectors required (minimum of four). Parameters to be considered when locating reflectors are as follows:

(1) The location must be at least 3,000 feet from the ASDE-3 antenna.

(2) The location should be in the general area of the ends of the runways. This location will be more specifically defined after the contractor has completed initial site testing.

(3) Unobstructed line-of-sight clearance must exist between ASDE-3 and the reflective target.

(a) The reflector location should be selected for minimum potential screening by vehicles or aircraft on runways/taxiways.

(b) Snow accumulation on buildings, and vegetation growth must be anticipated.

(4) The location must be accessible to maintenance.

(5) The location must be suitable for possible construction of a paved pad, which will provide a clear zone if required.

(6) The location cannot be within the instrument landing system (ILS) (Glide Slope and Localizer) antenna radiation pattern limitations.

31. PHYSICAL DESCRIPTION. The ASDE-3 may be configured as follows along with the ASDE equipment required for the configurations:

a. Standard Installation. The total system will be installed in the ATCT facility and will require approximately 225 square feet of floor space for the ASDE-3, of which 17 square

feet will be allocated to the control tower cab (displays and keyboards). Each additional display channel above three will require 8 additional square feet. For serviceability and functional considerations, the entire radar except the Antenna subsystem and the Cab components should be located in a single area on a level as close to the Antenna as possible. The length and routing of waveguide between the Transmitter/Receivers (T/R's) and the Antenna pedestal is limited to 100 feet (maximum) and video runs to the tower cab displays (without fiber optics) are limited to 300 feet (maximum). If the waveguide can be routed in a direct, vertical position from the center of the Antenna pedestal, the T/R may be 75 to 80 feet below. Each installation that will require bends, transitions, and flex sections to accommodate the tower design and equipment placement, must consider these requirements since these items contribute relatively high RF losses and will have significant impact on the allowable waveguide length.

(1) The equipment complement for the standard configuration ASDE-3 system is as follows:

One ea. antenna subsystem
One ea. T/R subsystem, consisting of two identical T/R channels
One ea. display processor subsystem consisting of:
- Three ea. digital scan converter units
- Three ea. map storage and control units
- Three ea. operational displays
- Three ea. display control units

One ea. Display Processor Interface Control Unit (DPICU)
Two ea. system control units
One ea. RMS
One set intercommunications subsystem
Four ea. fixed target reflectors
One set interconnecting cables

(2) For specific equipment locations, cable length limitations and operational requirements must be considered. The most restrictive limitation is a maximum of 35 feet of cable between any DPU and the RMS/Display Processor Interface Control Unit (DPICU). The T/R can be no more than 100 feet away from the Antenna and no more than 180 feet from the RMS/DPICU. These limitations specify cable and waveguide lengths only, not actual locations.

(3) For the purpose of system control and status monitoring, it is possible to have one operational display, its display controller and/or the RMS display/terminal located in the

ASR/ARTS equipment room. The video cables to this equipment cannot exceed 300 feet from the main ASDE-3 equipment room.

(4) The physical characteristics of the ASDE-3 major elements are shown in more detail in the following figures and tables:

(a)	Figure 3-2,	ASDE-3 ATCT Configuration
(b)	Figure 3-3,	ASDE-3 RT Configuration
(c)	Figure 3-4,	ASDE-3 Antenna Assembly
(d)	Figure 3-5,	ASDE-3 Installation Outline Elevation View
(e)	Figure 3-6,	ASDE-3 Installation Outline Plan View
(f)	Figure 3-7,	ASDE-3 Fixed Target Reflector Assembly
(g)	Figure 3-8,	ASDE-3 T/R Cabinet
(h)	Figure 3-9,	ASDE-3 Display Channel Electronics
(i)	Figure 3-10,	ASDE-3 RMS/DPICU
(j)	Figure 3-11,	ASDE-3 Operational Display
	Tables 3-1A & 1B	ASDE-3 Major Equipment Physical Characteristics

b. Remote Installations. In this configuration, the T/R cabinets, antenna system controller, and some minor items are collocated with the Antenna subsystem in a remotely located stand-alone tower. These functions are linked to the ASDE-3 components in the ATCT via a contractor supplied, FAA installed fiber-optic cable. The overall space requirement in the ATCT is accordingly reduced to about 150 square feet. In addition to the equipment specified as Standard Configuration, the Remote Tower (RT) also consists of the following:

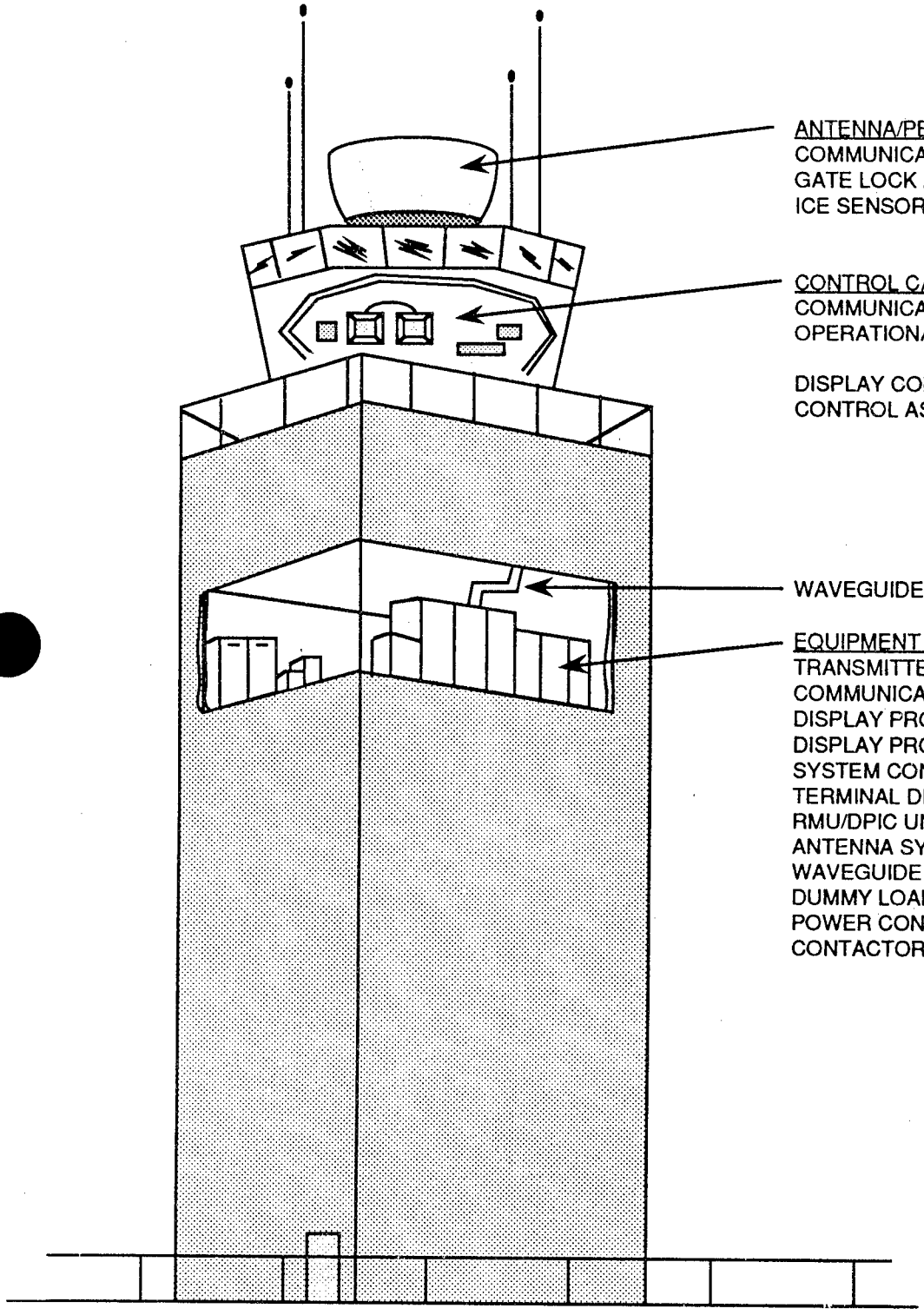
One ea. self supporting tower for remote installation of the antenna assembly

One ea. radar remoting unit, consisting of a fiber-optic video link and ancillary items
Two ea. radar cable junction boxes (RCJB)

c. Mosaicked Configuration. The equipment required to mosaic two or more ASDE-3 systems is dependent upon the combination of ASDE-3 systems equipment complement as selected from subparagraphs 31a or b. Unique equipment for this configuration consists of the following:

One ea. radar mosaic processor

FIGURE 3-2. ASDE-3 ATCT Configuration



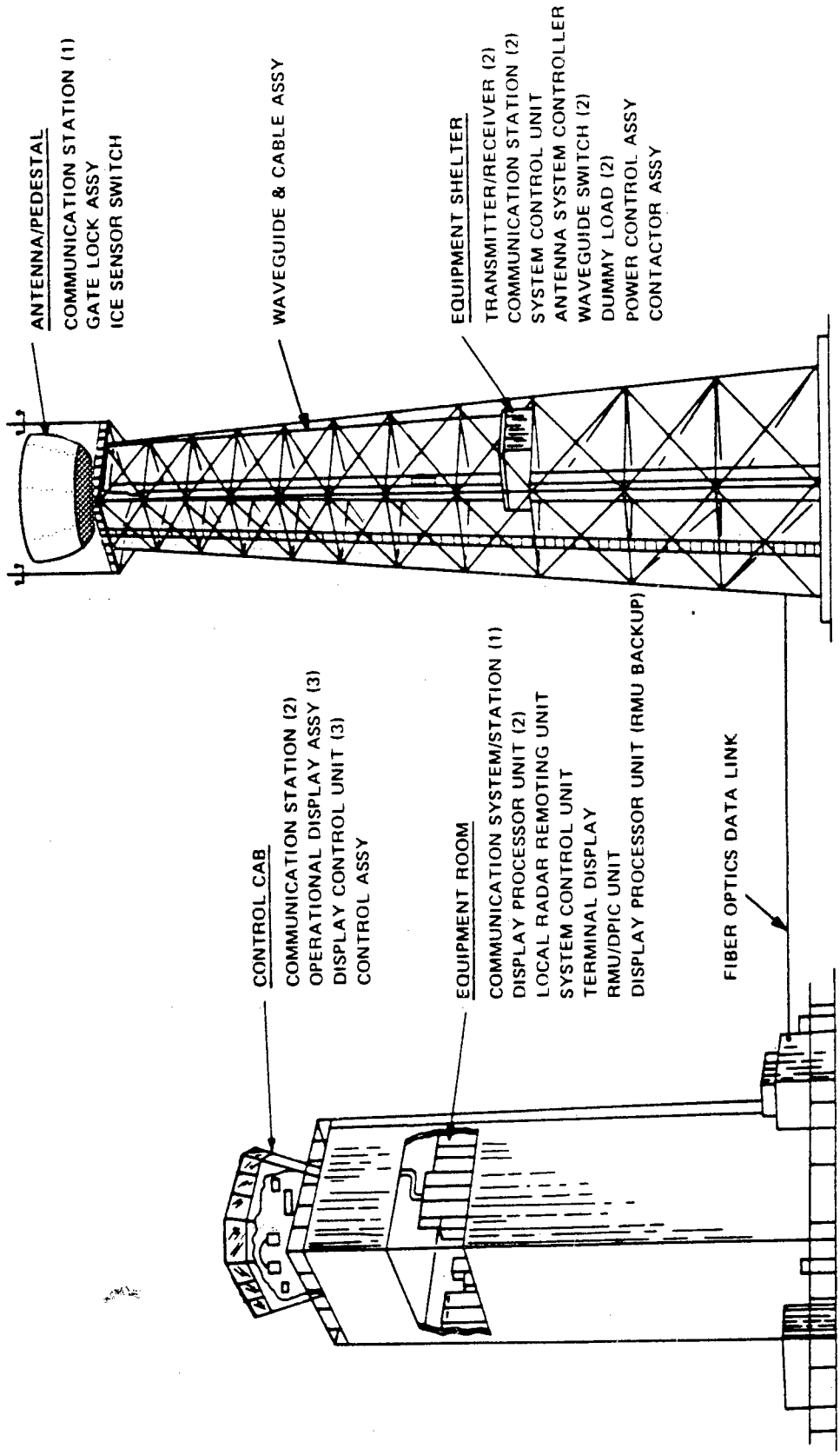


FIGURE 3-3. ASDE-3 RT Configuration

FIGURE 3-4. ASDE-3 Antenna Assembly

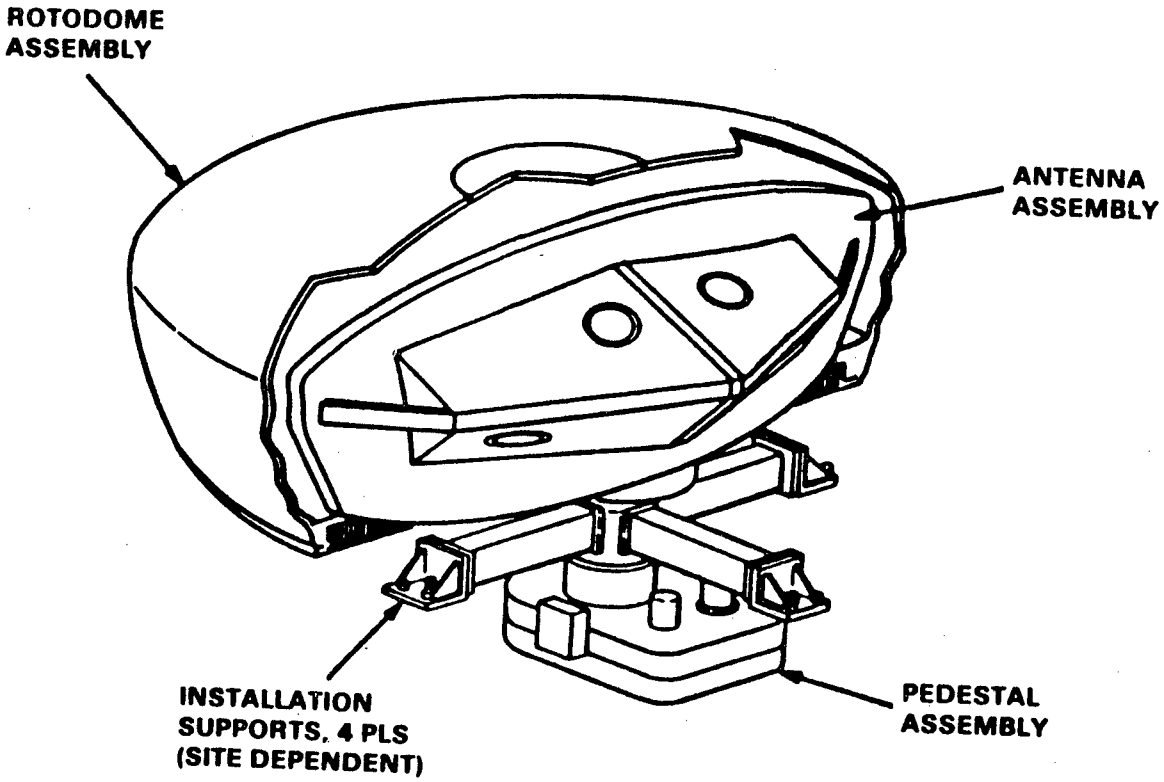


FIGURE 3-5. ASDE-3 Installation Outline Elevation View

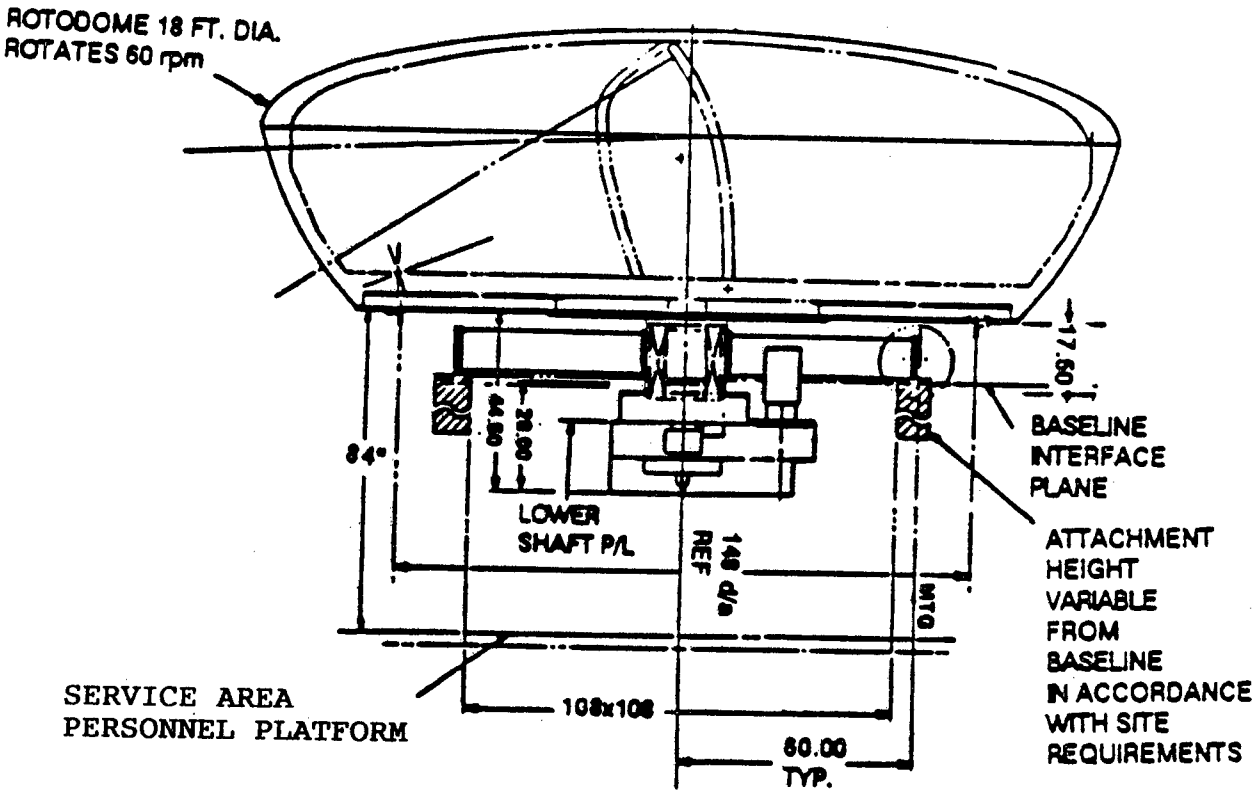


FIGURE 3-6. ASDE-3 Installation Outline Plan View

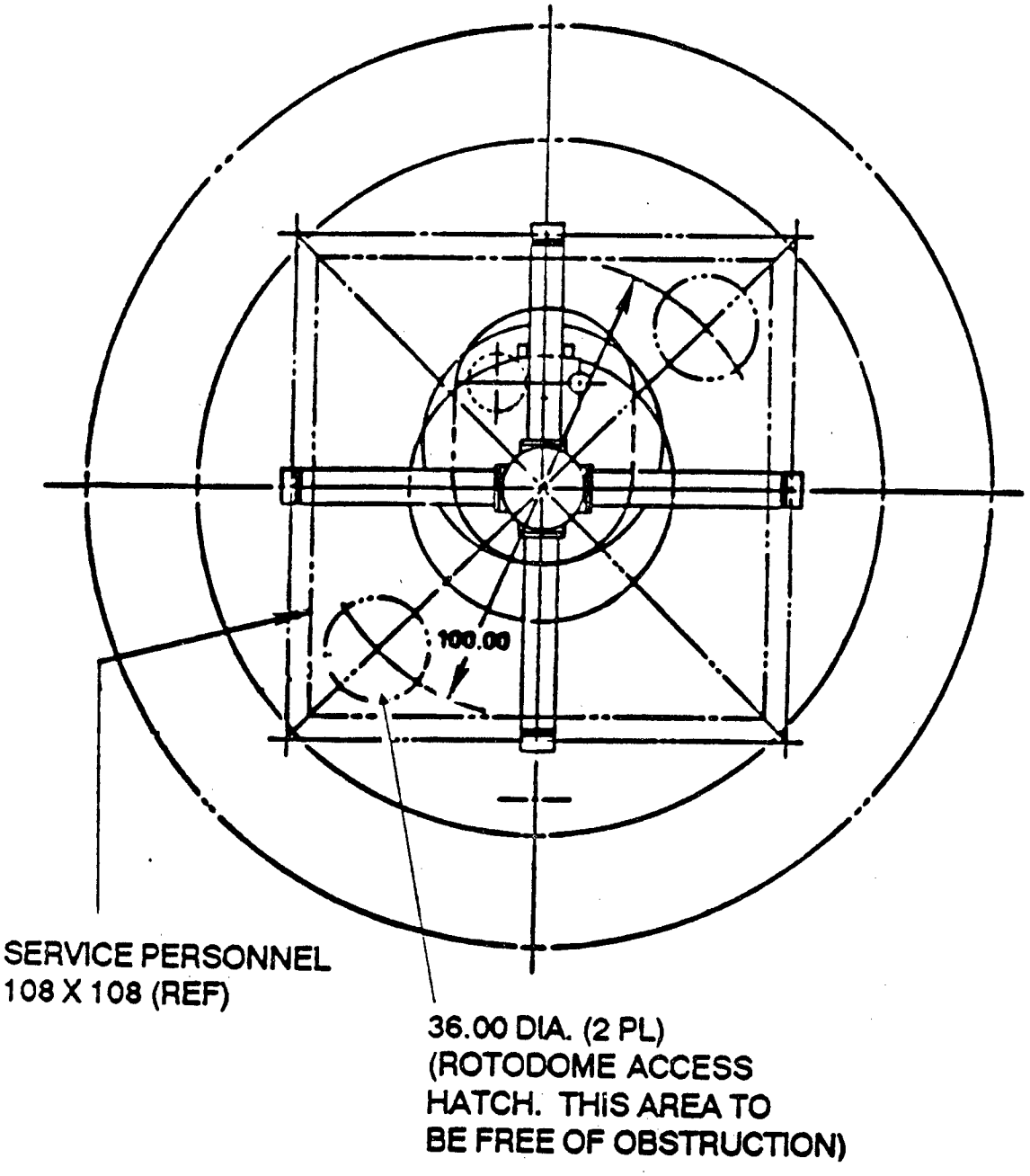
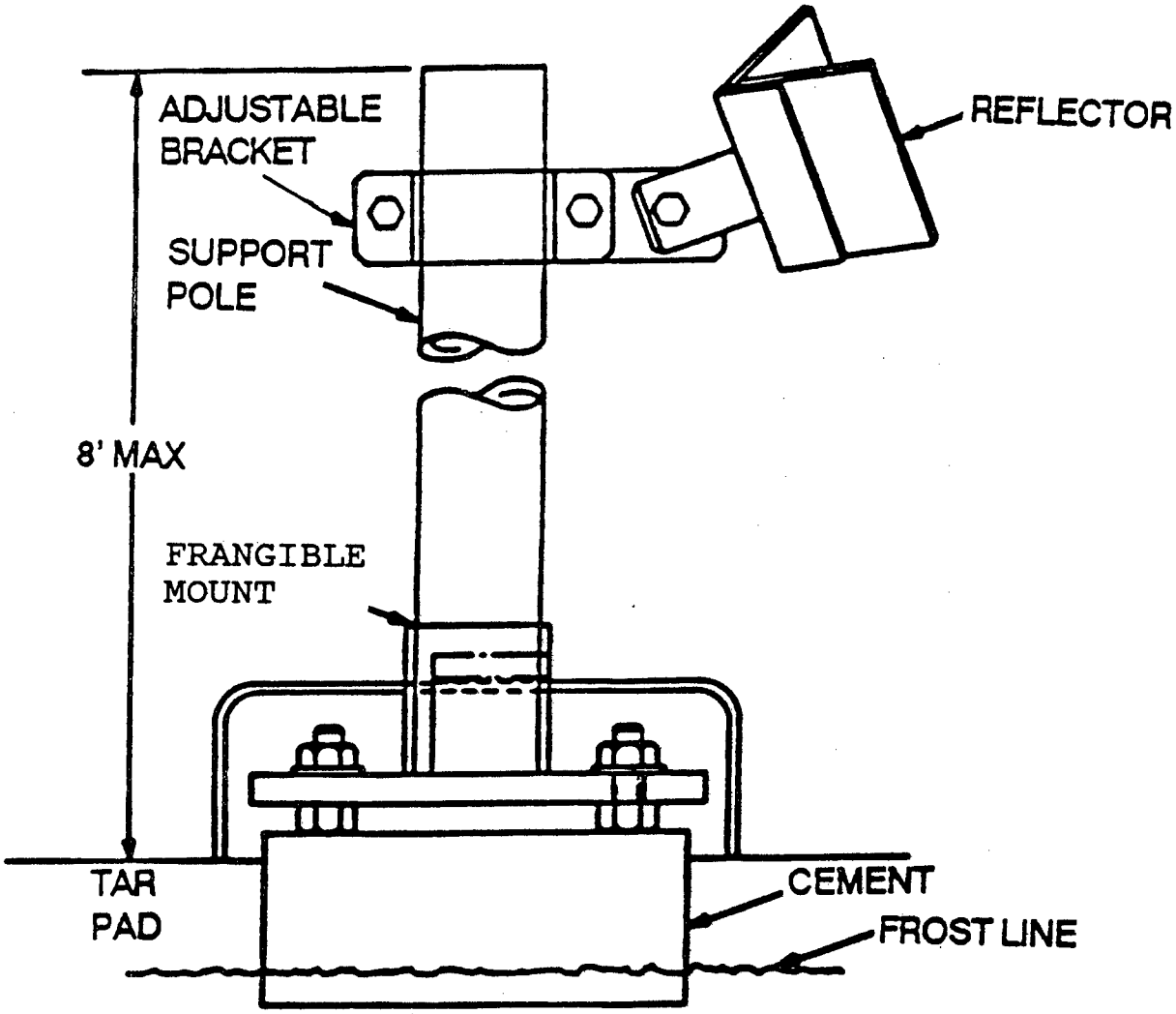


FIGURE 3-7. ASDE-3 Fixed Target Reflector Assembly



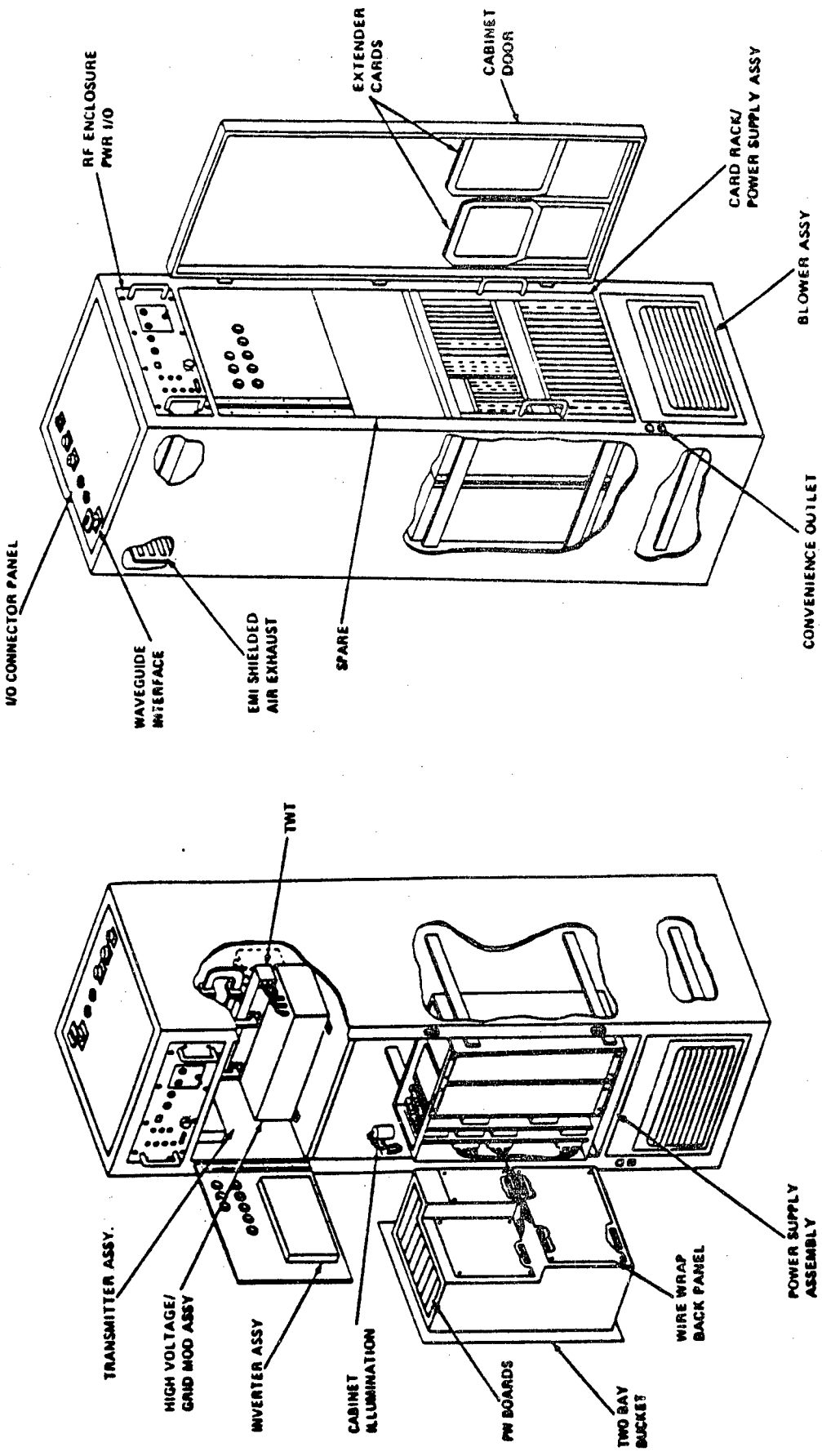
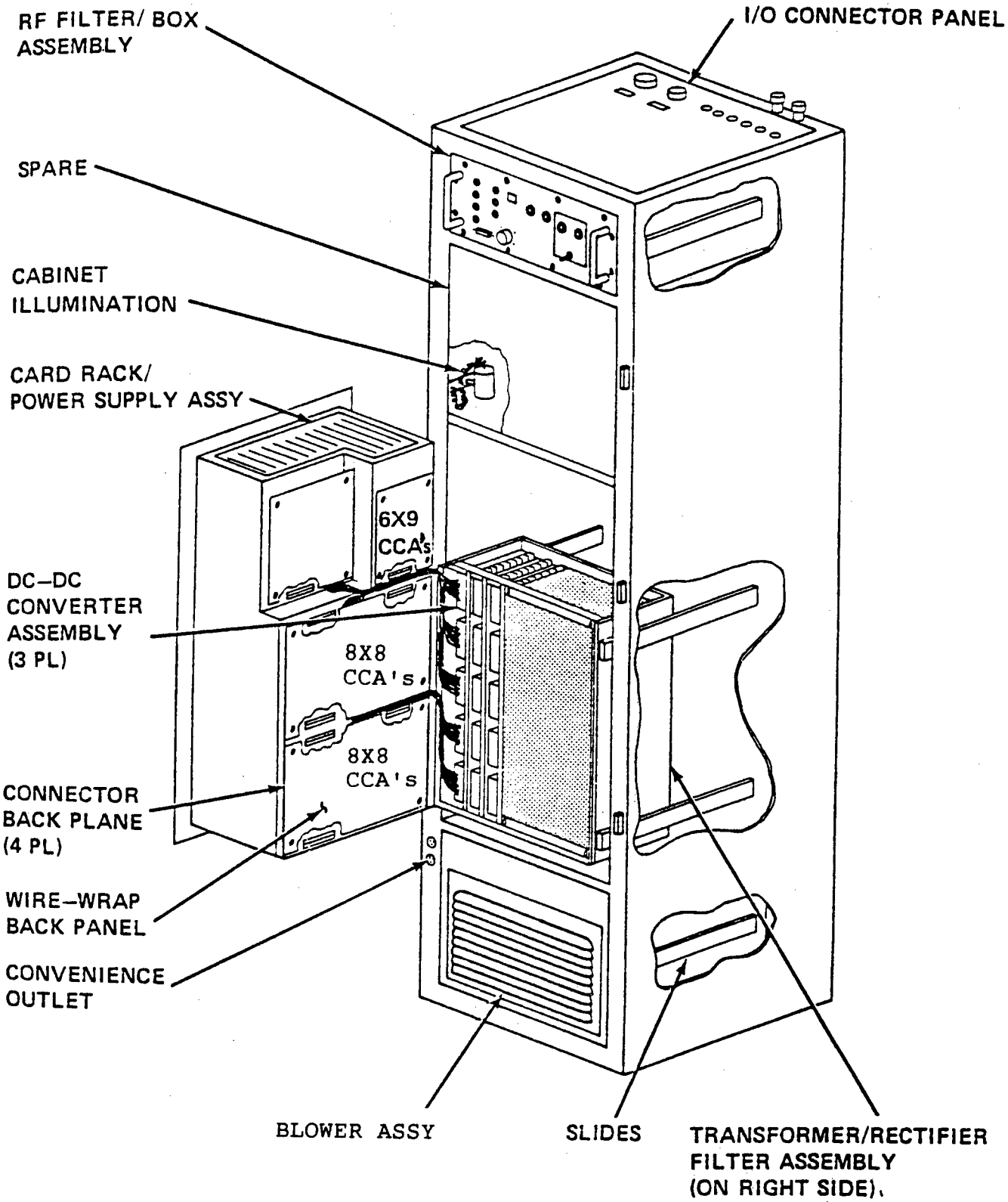


FIGURE 3-8. ASDE-3 T/R Cabinet

FIGURE 3-9. ASDE-3 Display Channel Electronics



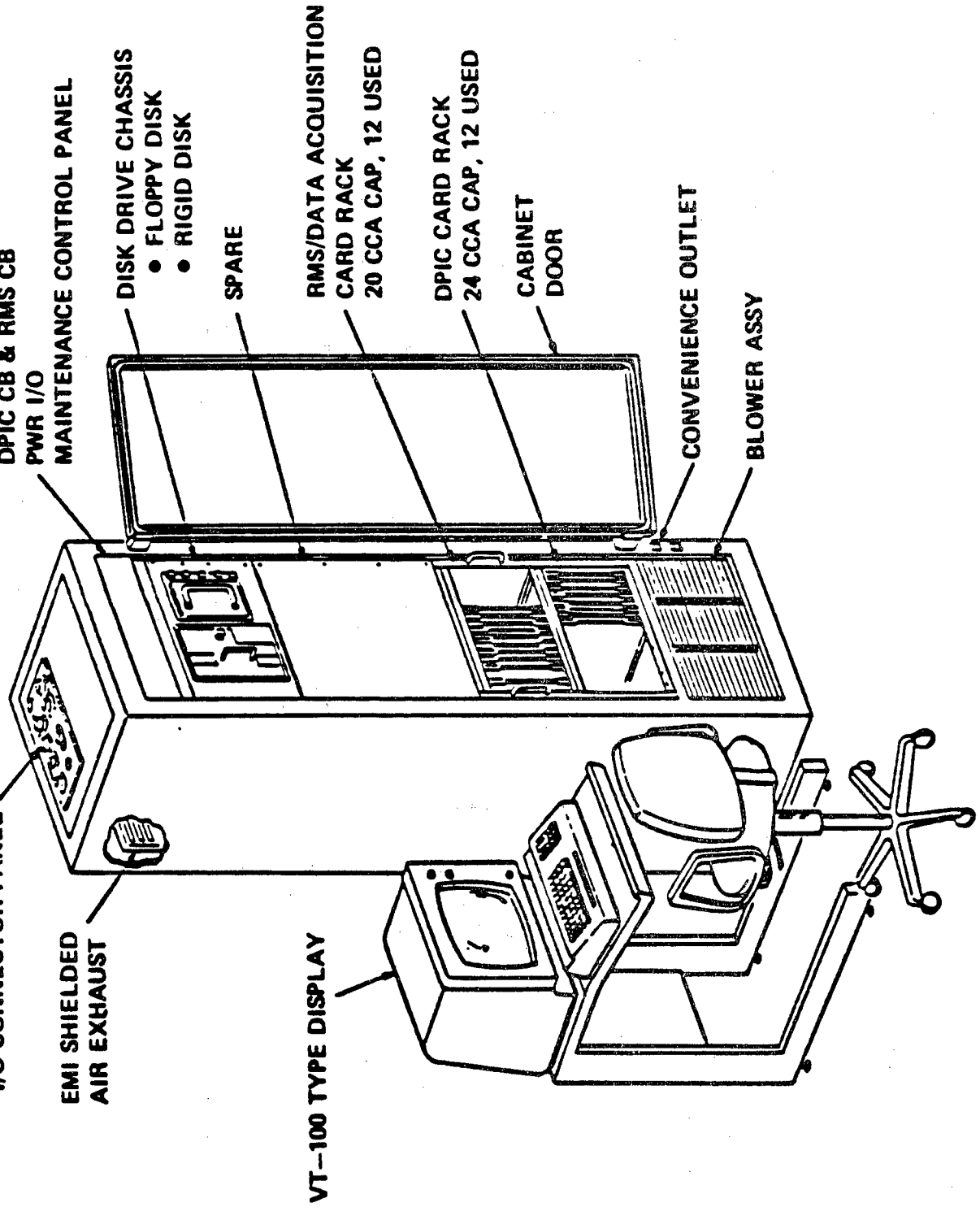


FIGURE 3-10. ASDE-3 RMS/DPICU

FIGURE 3-11. ASDE-3 Operational Display

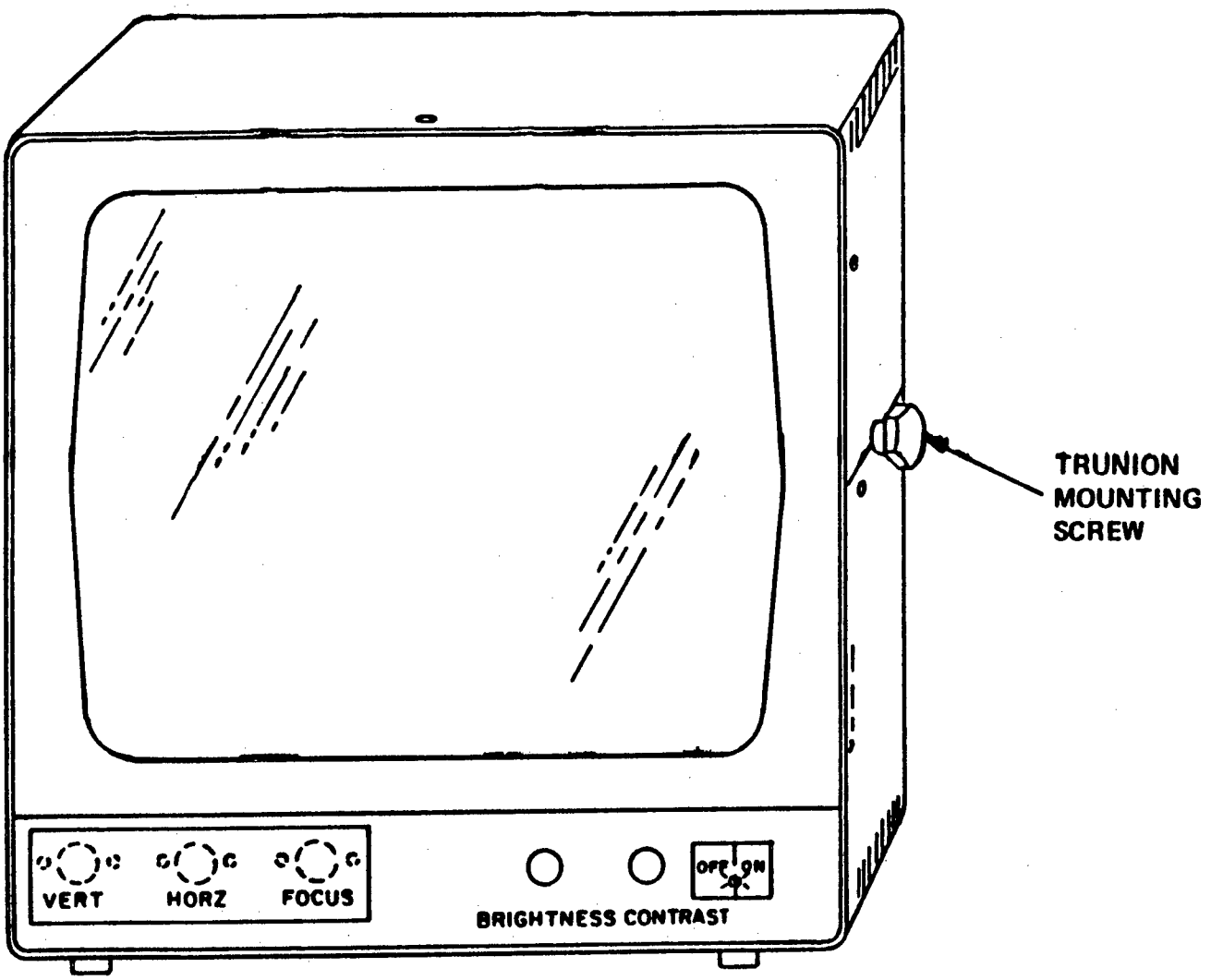


TABLE 3-1A. ASDE-3 Major Equipment Physical Characteristics

ITEM	EQUIPMENT	QTY	UNIT DIMENSIONS H X W X D (INCHES)	UNIT MTG AREA SQ.FT	MAX WEIGHT (POUNDS) UNIT	SYSTEM
1.	Cab Control Unit	1	3.5 X 12 X 7	.6	4.0	4.0
2.	System Control Unit	2	17 X 19 X 10	1.3	35	70
3.	Operational Display	3	18 X 18 X 24	3	125	375
4.	Display Control Unit (Maxi)	3	4 X 14.5 X 8.0	.8	8	24
	(Mini)					
5.	Transmitter/Receiver	2	72 X 24 X 24	4	750	1500
6.	Comm. System (Switch Unit)	1	36 X 24 X 24	2.3	80	80
7.	Comm. System Phones	5		1	5	25
8.	Display Processor Unit	3	72 X 24 X 24	4	505	1515
9.	Remote Monitoring System	1	72 X 24 x 24	4	520	520
10.	Dry Air System	1	8 X 19 x 14	10	20	20
	(2 Cylinders & Regulator)	2	51 X 9 dia	1.0	150	300
11.	Remote Monitor Display	1	30 X 24 X 30	5.0	30	30
12.	Fix Target Reflectors	4	5.4 X 5.4 X 72			
13.	TV Recorder	1	TBD			
14.	Display Processor Interface	1	7			
	and Control Assy					
15.	Antenna Reflector	1	5 FT. X 16 FT. HT		300	300
16.	Rotodome	1	18 FT. Dia X 6 FT HT		1600	1600
17.	Pedestal Assy	1	10.0 FT Dia X 4 FT HT	100	2700	2700
18.	Antenna System Controller	1	72 X 24 X 24	4.0	450	450
19.	Power Contact Box	1	48 X 36 X 15	3.5	250	250
20.	Power Control Box	1	5 X 5 X 3	0.1	2.0	2.0
21.	Ice Detector Probe And Mast	1	TBD			
22.	Roof Hatch Interlock	1	TBD			

TABLE 3-1B. ASDE-3 Major Equipment Physical Characteristics

		CAB ROOF		CONTROL CAB		EQUIPMENT ROOM		FLOOR LOADING (PSF)
ITEM	NOTE	AREA FT^2	LOAD LBS	AREA FT^2	LOAD LBS	AREA FT^2	LOAD LBS	
1	(3)			.6	4.0			
2	(4)					2.6	70.0	
3	(1)			9	375			
4	(3)			3.2	32	.8	8	
5						8	1500	188
6	(2)					2.3	80	
7	(5)	1	5	1	5	1.0	10	
8						12	1515	127
9						4	520	130
10						1.0	300	340
11	(3)					5.0	30	
12	(8)							
13	(5)							
14	(7)							
15								
16		254	300					
17	(6)		1600					
18			2700			4.0	450	
19	(2)					3.5	250	
20	(2)					.1	2.0	
21		1	150					
22		1	5					
TOTAL			4760		416		4735	

NOTES:

(1) Variable Mounting
(2) Wall Mounting
(3) Table Mounting
(4) Rack Mountable
(5) FAA Specified
(6) Exclusive Mounting
(7) Co-Located in RMS
(8) Located on Airport Grounds External to Facilities

d. Auxiliary and Options Items. ASDE-3 sites may be provided with additional ASDE-3 equipment (optional add-on is necessary to support unique site requirements and is as specified in the contract schedule. A list of these items is as specified in FAA-E-2725a as follows:

(1) Display Processor Subsystem add-on modules including digital scan converter, map storage and display control unit.

(2) Operational display; 14-, 17-, or 19-inch diagonal.

(3) Display control unit.

(4) Map Preparation Unit (MPU).

(5) Fixed target reflectors.

(6) Radar mosaic processor and supporting interface.

(7) Software/hardware.

(8) Self-supporting tower and equipment shelter.

(9) Radar remoting unit consisting of a fiber-optic video link with ancillary items.

(10) RCJB.

(11) Radar video recorder (VHS tape) and playback for engineering analysis.

32. SYSTEM REQUIREMENTS. The ASDE-3 system requirements for electrical power, floor space, and floor load requirements are shown in table 3-1A and B. Requirements for major equipment parameters are shown in the following tables:

Table 3-2A	ASDE-3 Major Facility Power Requirements
Table 3-2B	ASDE-3 Major Equipment Parameters
Table 3-2C	ASDE-3 Environmental Control and Utility Power Requirements

a. The ASDE-3 is being designed to accept the required input signals and will meet the specified requirements for NAS integration. It is in compliance with Federal Communications Commission requirements for frequency and radiated emissions.

TABLE 3-2A. ASDE-3 Major Equipment Power Requirements

ASDE-3 FACILITY POWER REQUIREMENTS
Standard Local Tower Configuration

Essential Power

Component Name	Qty	Volts	Phs	Unit KVA	Total KVA	Unit KW	Total KW
ATCT CAB							
Cab Control Unit	1	24VDC	-	0.01	0.01	0.01	0.01
Operational Disp	2	120VAC	1	0.29	0.58	0.25	0.50
Display Cntrl Unt	2	24VDC	-	0.03	0.06	0.03	0.06
Comm Systm Phone	1	N/A	-	N/A	N/A	N/A	N/A
Subtotal				0.33	0.65	0.29	0.57
EQUIP ROOM							
SCU Rack	2	24VDC	-	0.06	0.12	0.06	0.12
TMTR/RCVR	2	208VAC	3	1.47	2.94	1.25	2.50
Disply Proc Unit	3	208VAC	3	1.29	3.87	1.10	3.30
RMS/Disp Proc	1	208VAC	3	0.94	0.94	0.80	0.80
Rem Mon Disp	1	120VAC	1	0.06	0.06	0.05	0.05
Dry Air System	1	N/A	-	N/A	N/A	N/A	N/A
Dry Air Sys Cyl	2	N/A	-	N/A	N/A	N/A	N/A
Ant System Cntrl	1	208VAC	3	0.88	0.88	0.75	0.75
Operational Disp	1	120VAC	1	0.29	0.29	0.25	0.25
Display Cntrl Unt	1	24VDC	-	0.03	0.03	0.03	0.03
Comm Systm Switch	1	120VAC	1	0.06	0.06	0.05	0.05
Ant Pwr Cntctr Bx	1	24VDC	-	0.05	0.05	0.05	0.05
Ant Pwr Cntrl Box	1	N/A	-	N/A	N/A	N/A	N/A
Utility	3	120VAC	1	1.65	4.94	1.4	4.2
Subtotal				6.78	14.18	5.79	12.1
ATCT EXTERIOR							
Ant/Ped System	1	208VAC	3	4.95	4.95	4.7	4.7
Pedestal Heater	1	208VAC	3	2.3	2.3	2.0	2.0
Subtotal				7.25	7.25	6.7	6.7
ESSENTIAL TOTAL				14.36	22.08	12.78	19.37

Non-Essential Power

Component Name	Qty	Volts	Phs	Unit KVA	Total KVA	Unit KW	Total KW
ATCT EXTERIOR Rotodome Heater	2	208VAC	3	17.0	34.1	14.5	29.0
NON-ESSENTIAL TOTAL				17.0	34.1	14.5	29.0

TABLE 3-2B. ASDE-3 Major Equipment Parameters

Characteristic	Performance
Frequency Range	15.7 — 17.7 GHz
Peak RF Power	3 kW minimum
Pulse Width	40 ns ±5 ns
PRF (Normal Mode)	16,384 or 16,000 Hz
(Optional PRFs)	4,000, 4,096, 8,000, 8,192 Hz
Instrumented Range	500 to 24,000 feet
Waveform	Pulse–to–pulse frequency agility
No. of Frequencies	16
Pulse–to–Pulse Spacing	25 MHz minimum to 125 MHz maximum
Antenna	
Gain	44.4 dB/C referenced to input to rotary joint
Horizontal 3–dB Beamwidth	0.25 degree ±0.025 degree
Vertical 3–dB Beamwidth	1.6 degree
Vertical Pattern	$\csc^{1.5}$ from 0.8 to 3.2 deg
	csc from 3.2 to 31 deg
Polarization	Circular
Integrated Cancellation Ratio	17 dB minimum
Horizontal Sidelobes	24 dB minimum
Scan Speed	60 RPM ±5%
Receiver Noise Figure	4.8 dB
Receiver Dynamic Range	35 dB minimum
Receiver Bandwidth	50 MHz
A/D Clock Rate	42 MHz
Data Cell Width	12 feet by 0.04 degree
A/D Bits	8
Data Bits	4
Display Scales	2,000 to 24,000
Display Size	17 inches, 4:3 aspect
Video Bandwidth	45 MHz
Display Electronics Dynamic Range	38 dB
No. of Display Channels	3 expandable to 8
Environmental	
Temperature	+50 to +122°F (I)
	+14 to +122°F (II)
	–58 to +158°F (III)
Relative Humidity	10 to 80 percent (I)
	5 to 90% (II)
	5 to 100% (III)
Attitude	Sea level to 10,000 feet above
Wind	To 110 mph (III)
Ice Loading	Encased in 0.5–inch radial thickness clear ice during any or all of above class III conditions (III)

I = Equipment installed in attended facility
II = Equipment installed in unattended facility
III = Equipment installed outdoors (antennas, field detectors, etc.)

TABLE 3-2C. ASDE-3 Environmental Control and Utility Power Requirements

ASDE-3 Facility Power Requirements Remote Tower Configuration

Essential Power

Component Name	Qty	Volts	Phs	Unit KVA	Total KVA	Unit KW	Total KW
ATCT CAB							
Operational Disp	2	120VAC	1	0.29	0.58	0.25	0.50
Cab Control Unit	1	24VDC	-	0.01	0.01	0.01	0.01
Display Cntrl Unt	2	24VDC	-	0.03	0.06	0.03	0.06
Comm Systm Phone	1	N/A	-	N/A	N/A	N/A	N/A
Subtotal				0.33	0.65	0.29	0.57
EQUIP ROOM							
Disply Proc Unit	3	208VAC	3	1.29	3.87	1.10	3.30
RMS/Disp Proc	1	208VAC	3	0.94	0.94	0.80	0.80
Rem Mon Disp	1	120VAC	1	0.06	0.06	0.05	0.05
Operational Disp	1	120VAC	1	0.29	0.29	0.25	0.25
Comm Systm Switch	1	120VAC	1	0.06	0.06	0.05	0.05
Utility	3	120VAC	1	1.65	4.95	1.4	4.2
SCU Rack	2	24VDC	-	0.06	0.12	0.06	0.12
Display Cntrl Unt	1	24VDC	-	0.03	0.03	0.03	0.03
Local Rdr Rem Unt	1	15VDC	-	0.08	0.08	0.08	0.08
Subtotal				4.46	10.40	3.82	8.88
ESSENTIAL TOTAL				4.79	11.05	4.11	9.45

Component Name	Qty	Volts	Phs	Unit KVA	Total KVA	Unit KW	Total KW
REMOTE TOWER/ SHELTER							
TMTR/RCVR	2	208VAC	3	1.47	2.94	1.25	2.50
Ant System Cntrl	1	208VAC	3	0.88	0.88	0.75	0.75
Ant/Ped System	1	208VAC	3	4.95	4.95	4.7	4.7
Pedestal Heater	1	208VAC	3	2.3	2.3	2.0	2.0
HVAC	1	208VAC	3	7.55	7.55	6.42	6.42
Light Fixtures	2	120VAC	1	0.09	0.18	0.08	0.16
Utility Outlets	3	120VAC	1	1.64	4.95	1.4	4.2
Ant Pwr Cntctr Bx	1	24VDC	-	0.05	0.05	0.05	0.05
Rem Rdr Rem Unt	1	15VDC	-	0.08	0.08	0.08	0.08
Ant Pwr Cntrl Box	1	N/A	-	N/A	N/A	N/A	N/A
Dry Air System	1	N/A	-	N/A	N/A	N/A	N/A
Dry Air Sys Cyl	2	N/A	-	N/A	N/A	N/A	N/A
Subtotal				19.01	11.13	8.75	10.0
ESSENTIAL TOTAL				14.36	23.88	16.73	20.86

Nonessential Power

Component Name	Qty	Volts	Phs	Unit KVA	Total KVA	Unit KW	Total KW
REMOTE TOWER/ SHELTER							
Rotodome Heater	2	208VAC	3	17.0	34.1	14.5	29.0
NONESSENTIAL TOTAL				17.0	34.1	14.5	29.0

b. Radiated power density calculations as performed to evaluate radiation safety indicate a 0.029 mw/cm^2 power density at the closest points to the external surface of the rotodome, unfocused power. A worst case calculation for maximum power assumed a focused field at ground intercept of a 50 foot tower. It yielded a power density of 0.113 mw/cm^2. These values are well below established maximum radiation guidelines; OSHA of 10 mw/cm^2, or Order 3910.3A, Radiation Health, Hazard, and Protection of 5 mw/cm^2.

33. INTERFACES. The ASDE-3 will interface with the ATCT controllers and the RMMS.

a. ASDE/ATCT Controller. The ASDE-3 provides a video display to the tower controllers and maintenance personnel, which indicates the range, direction and movement of surface traffic on the airport movement areas. The ASDE-3 receives inputs from ATCT controllers and maintenance personnel in the form of RMS display quality reports, display controls, and radar equipment controls.

b. ASDE-3/RMMS. The ASDE-3 has an embedded RMS that includes an interface with the remainder of the RMMS. Generally, the interface will be with an Remote Monitoring Subsystem Concentrator (RMSC), but could also be with either a sector Maintenance Processor System (MPS) or en route MPS depending on the location of the ASDE-3. This interface will be a common-type interface for all remote facilities and will be discussed in the RMS section.

External equipment interfaces will be defined in a contractor developed Interface Control Document (ICD) and shall be designed to meet all electrical interface requirements with regard to interchange of data, timing, and data control procedures for bit oriented data exchanges, as specified in Remote Maintenance Monitoring System Interface Control Document, NAS-MD-790. Figure 3-12, ASDE-3 Interface Block Diagram, shows the ASDE-3 major interfaces while the system-level interface message types for the ASDE-3 system are shown in table 3-3. Refer to the NAS System Specification (NAS-SS-1000), Volumes I and III and the ASDE-3 ICD for more detailed information on these interfaces.

34. SOFTWARE SUBSYSTEM OVERVIEW. The ASDE-3 software subsystem is comprised of real-time operational programs. It utilizes a number of 80286 based microprocessors that are individually tasked. The ASDE-3 software programs, less the 80286 operating system, comprise approximately 110,000 lines of code. The lines of code were assembled for the ASDE-3 in "program language for microprocessors," (PL/M) and is distributed into four main elements as illustrated in figure 3-13. A common communication

FIGURE 3-12. Interface Block Diagram

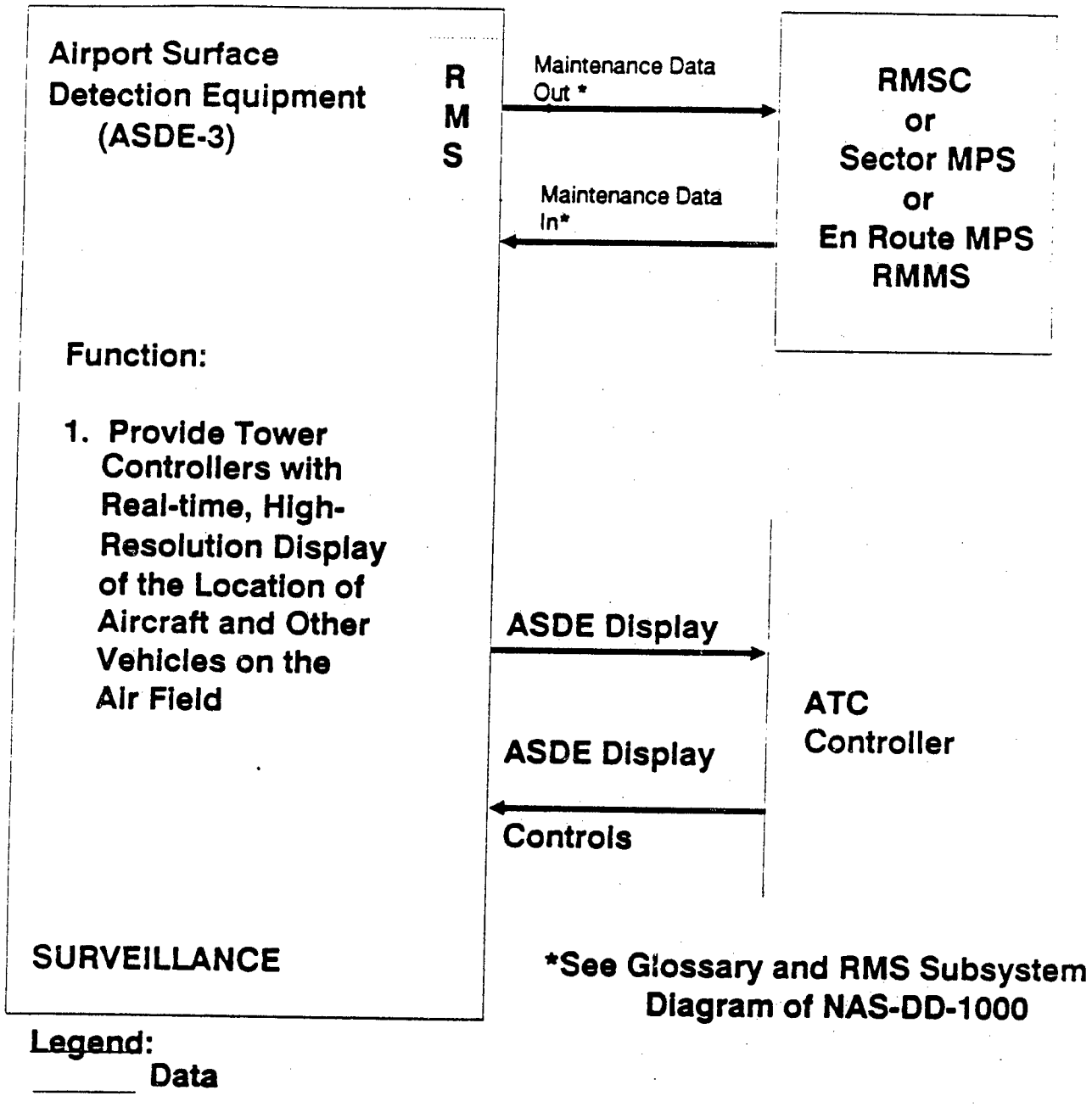


TABLE 3-3. ASDE-3 System Level Interface Message Types

ID	SOURCE (FROM)	SINK (TO)	MESSAGE NAME
A	ATCT CNTL	ASDE-3	ASDE DISPLAY ASDE DISPLAY CONTROL
B	ASDE-3	MDT	CETRIFICATION TEST DATA DIAGNOSTICS TEST DATA MAINTENANCE MANAGEMENT DATA RESPONSE SITE DATA REPORT SUBSYSTEM STATUS
C	MDT	ASDE-3	CERTIFICATION TEST COMMAND CORRECTIVE MAINTENANCE DATA DIAGNOSTIC TEST COMMAND MAINTENANCE MANAGEMENT DATA RESPONSE PREVENTIVE MAINTENANCE DATA RMMS CONTROL COMMAND
D	ASDE-3	MPS	CERTIFICATION TEST DATA CORRECTIVE MAINTENANCE DATA DIAGNOSTICS TEST DATA MAINTENANCE MANAGEMENT DATA RESPONSE PREVENTIVE MAINTENANCE DATA SITE DATA REPORT SUBSYSTEM STATUS
E	MPS	ASDE-3	CERTIFICATION TEST COMMAND CONTINUOUS POLL DIAGNOSTIC TEST COMMAND MAINTENANCE MANAGEMENT DATA RESPONSE RMMS CONTROL COMMAND SCHEDULED POLL
F	ASDE-3	RMSC	CERTIFICATION TEST COMMAND CORRECTIVE MAINTENANCE DATA DIAGNOSTIC TEST DATA MAINTENANCE MANAGEMENT DATA RESPONSE PREVENTIVE MAINTENANCE DATA SITE DATA REPORT SUBSYSTEM STATUS
G	RMSC	ASDE-3	CERTIFICATION TEST COMMAND CONTINUOUS POLL DISGNOSTIC TEST COMMAND MAINTENANCE MANAGEMENT DATA RESPONSE RMMS CONTROL COMMAND SCHEDULED POLL

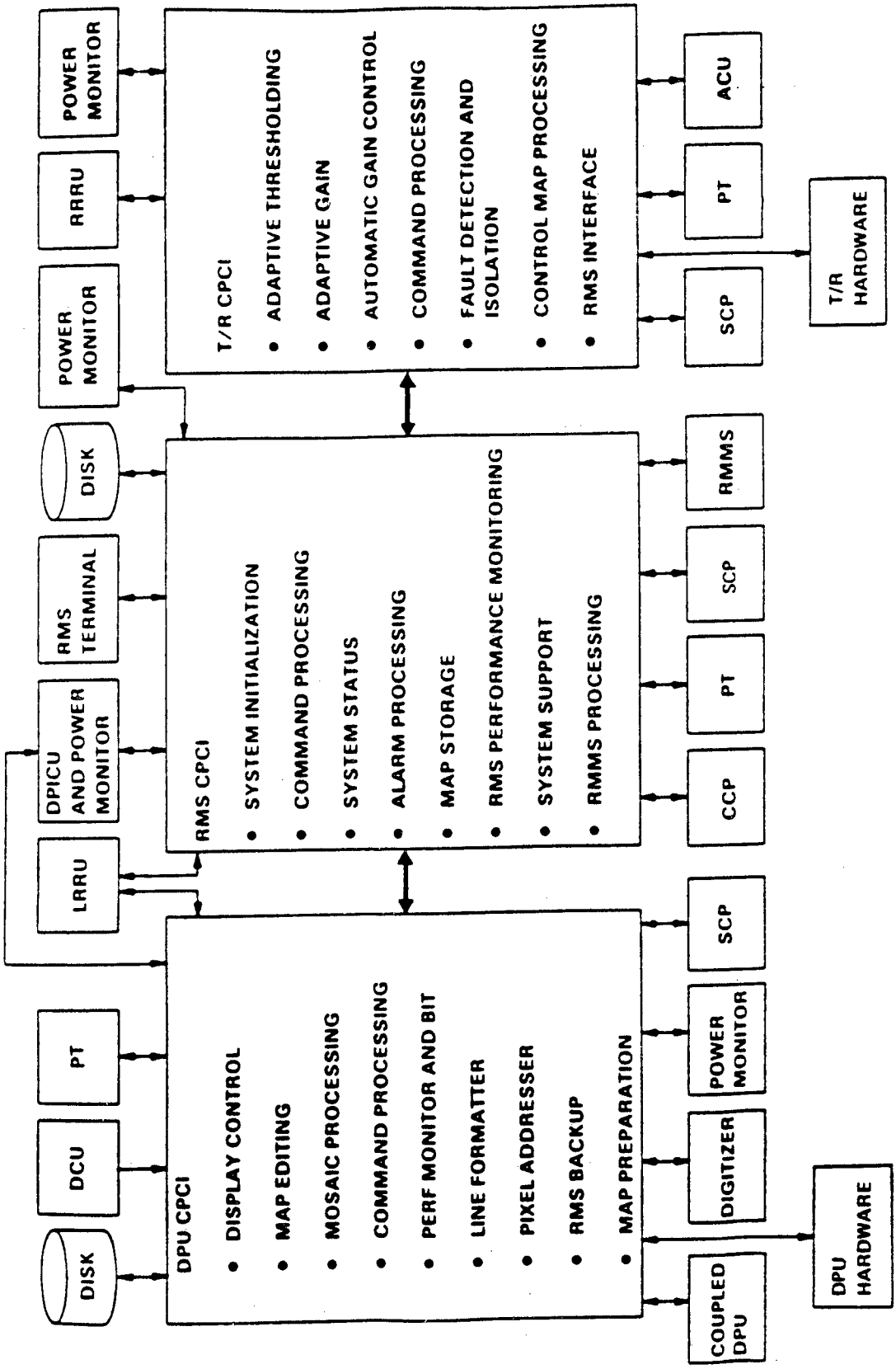


FIGURE 3-13. ASDE-3 Software Overview Diagram

buss is provided to tie the elements, each identified as a computer program configuration item (CPCI). The four CPCI's are identified in subparagraphs a through d. Each of the first three CPCI's is associated with a corresponding major unit in the system. A complete ASDE-3 system normally comprises of at least two T/R's, three DPU's and one RMS. The software for the MPU is identical to the DPU CPCI and hence is not treated as a separate CPCI. A fourth CPCI was created for system software. This CPCI includes software common to the first three CPCI's and software used in smaller processors that are used numerously throughout the equipment. Common software includes the Operating System (OS), disk controller, and programs for the 80186 frontend processor(s) used for the serial links and Synchronous Data Link Control (SDLC). An SDLC data link is used for communication by the major units with the RMS. An overview of the major functions that are provided by each CPCI is shown in figure 3-13, ASDE-3 Software Overview Diagram.

a. CPCI Summary for T/R's. All the operational software developed for the T/R's subsystem is placed in the T/R's CPCI. This CPCI can be divided into five main functional areas. Software that is required to operate on radar data to support the performance requirements of the T/R is allocated to the operational data processing function. The second area, command processing, contains software needed to interface with the RMS regarding status and control information. The third area is the processing required to implement fault detection and isolation. The fourth area, control map interface, is related to the processing of map information transferred to the T/R from the map store located in the RMS. Processing required to transfer data to and from minor units attached to the T/R is placed in the last functional area.

(1) The operational data processing function of software is critical to the hardware implementation of two major performance requirements, adaptive thresholding and adaptive gain. Adaptive thresholding in the receiver maintains a desired false alarm rate during conditions that can increase the amount of clutter. The software area adaptive thresholding function generates a threshold value based on samples of clutter measurements made by the hardware. This threshold is fed back to the hardware to be used in the target detection process during the next scan for a localized area.

(2) The adaptive gain requirement in ASDE-3 is also supported by software. Adaptive gain is used automatically to compensate for decreased receiver sensitivity due to rain attenuation. Fixed test target reflectors are placed around the airport to enable the radar to obtain an estimate of rain

attenuation. Signal levels of the fixed targets are sent to the processor for analysis. Results of the analysis are used to generate a Sensitivity Time Constant (STC) gain adjustment factor which is transferred to the STC hardware.

(3) Also included in this major function is the processing for Automatic Gain Control (AGC). This process is used to compensate for changes in the receiver gain due to component aging or parameter drifts. Unlike the adaptive gain processing, AGC is not dependent on the operating environment of the ASDE-3, but only on the behavior of the electrical components.

b. CPCI Summary for DPU/MPU. The DPU/MPU CPCI contains all the software for the processors located in the DPU. Software processing is used to support the implementation of display adjustments requested by the operator. Other major software functions include map editing and generation of control maps. Software is also used to process information entered via the display control unit and the RMS. The MPU is very similar to a display channel. Since the MPU is not required to process radar video, the hardware associated with processing video data from the T/R is not included in the MPU. The software functions are similarly scaled down. However, in order to provide commonality between the DPU and the MPU, this CPCI will contain all the code required for both units. After designating the unit, certain portions of the code will be accessed while others will not. The majority of the code is active whether the CPCI is installed in a DPU or an MPU.

c. CPCI Summary for RMS. The purpose of the RMS is to: monitor the entire system for performance, alarm conditions and faults; establish and maintain the configuration of the system, as requests are made from other sources; provide a means, via the system control bus, of intra-system communication; and, accept direct commands from the RMMS. Also, the RMS serves as a central location for processing commands entered from a variety of sources. Controls are routed to the major units in the system over the SDLC link. Major units, T/R's and DPU's, are distinguished by the use of a 80286 processor. Minor units communicate with the RMS through a major unit or directly with the RMS via an asynchronous serial link. These units have an 8031 microprocessor to implement the protocol and message decoding for the asynchronous serial link. Commands are entered via the RMS terminal, DCU, portable terminal (PT), System Control Panels (SCP), Cab Control Panel (CCP) or from the RMMS. The portable terminal and SCP can be interfaced with the RMS directly or through a major unit.

d. CPCI Summary for Systems Software. System software includes the operating system for the 80286 processor, code for the 80186 signal communications frontend processor, code for the 80186 disk controller, and code for the 8031 microcontroller used in various applications. The OS is required in the main processors to manage the resources available to the 80286 processor. The 8031 micro-controllers are used in the implementation of the asynchronous interface on the device side of the serial link. Minor processing is also performed by the 8031 resident in the Antenna Control Unit (ACU) to support certain functions. The 8031 is used in a Circuit Card Assembly (CCA) called the Display Processor Interface Control Unit (DPICU) link. This CCA is used whenever a serial asynchronous interface with the 80286 processor of a major unit is required.

35.-39. RESERVED.

CHAPTER 4. PROJECT SCHEDULE AND STATUS

40. PROJECT SCHEDULES AND GENERAL STATUS. ASDE-3 project schedules have been developed and are maintained currently on a bimonthly basis, as a minimum. Project schedules are maintained by ANR-200, using an automated planning and scheduling tool known as ARTEMIS. Through the use of ARTEMIS, the program manager can rapidly assess changes/impacts and execute updates to the NAS milestones. This data is made immediately available to concerned users who may access specific types of information in special reporting forms. Tables 4-1 and 4-2 show examples of these reports. Table 4-1, ASDE-3 Equipment Delivery Report, depicts the ASDE-3 delivery schedule by location and region. Also addressed within this report are the schedule (baseline) and forecasted (project) dates for each delivery. Table 4-2, ASDE-3 Milestone Description Report provides, in tabular format, the data contained within the Master Baseline Schedules, and specifically for the ASDE-3 Summary Milestones Schedule shown in figure 4-1.

41. MILESTONE SCHEDULE SUMMARY. Figure 4-1, ASDE-3 Milestone Schedule, shows the ASDE-3 Summary Milestone Schedule that was baselined in February 1991. This figure is used for information only, but does reflect the actual ASDE-3 milestones. However, the schedules are dynamic and updates are made on a bimonthly basis, as a minimum. Current copies of these schedules are available through the ASDE-3 PM or ARTEMIS.

42. INTERDEPENDENCIES AND SEQUENCE. The ASDE-3 must interface with the RMMS as defined in paragraph 33 before it can achieve its full functional capability. The RMMS is currently scheduled to be deployed following the ASDE-3 installations. There is no impact on the implementation of the ASDE-3 as a result of the relationship with RMMS.

43.-49. RESERVED.

TABLE 4-1. ASDE-3 Equipment Delivery Report

ASDE-3 EQUIPMENT DELIVERY SCHEDULE
(Established by Contract Mod. 0023)

Sequence Location	System No.	L/R*	Disp. Size/No.	Delivery Date**
Pittsburgh, PA	01	L	19"/4	12/31/91
FAA Academy, OK	02	R	17"/3	06/30/91
FAA Technical Center***	03	R	17"/3	05/31/91
Dallas, TX	04	L	17"/5	02/28/92
Philadelphia, PA	05	L	14"/4	02/28/92
Los Angeles, CA	06	R	19"/5	03/31/92
Detroit, MI	07	L	17"/5	03/31/92
Atlanta, GA****	08	L	14"/7	04/30/92
San Francisco, CA	09	R	17"/3	11/01/91
Boston, MA	10	L	14"/4	05/31/92
Newark, NJ	11	L	17"/4	05/31/92
New York - JFK	12	L	14"/4	06/30/92
Cleveland, OH	13	L	17"/4	06/30/92
Portland, OR	14	L	14"/3	07/31/92
Seattle, WA	15	R	19"/4	07/31/92
Washington - Dulles	16	R	17"/4	08/31/92
Washington - Andrews	17	L	17"/3	08/31/92
Miami, FL	18	L	17"/5	09/30/92
New York - La Guardia	19	L	14"/4	09/30/92
St. Louis, MO	20	R	17"/5	10/31/92
Houston, TX	21	L	19"/5	10/31/92
Washington - National	22	L	14"/3	11/30/92
Memphis, TN	23	R	17"/6	11/30/92
Minneapolis, MN	24	L	17"/4	12/31/92
Chicago, IL	25	L	19"/6	12/31/92
Tampa, FL	26	L	14"/5	01/31/93
Baltimore, MD	27	L	17"/4	01/31/93
New Orleans, LA	28	L	14"/3	02/28/93
Kansas City, MO	29	R	17"/3	02/28/93
Anchorage, AK	30	L	19"/3	03/31/93
Denver, CO (DVX)	31	R	19"/4	03/31/93
Los Angeles, CA	32	R	--	04/30/93
Houston, TX	33	R	--	04/30/93

Note: * L/R - Identifies the ASDE-3 system as configured for either a Local or Remote configuration.

** Date wherein the ASDE-3 hardware has completed factory test and is available for turnkey site delivery. Contract requires turnkey installation to be completed within four months of this date.

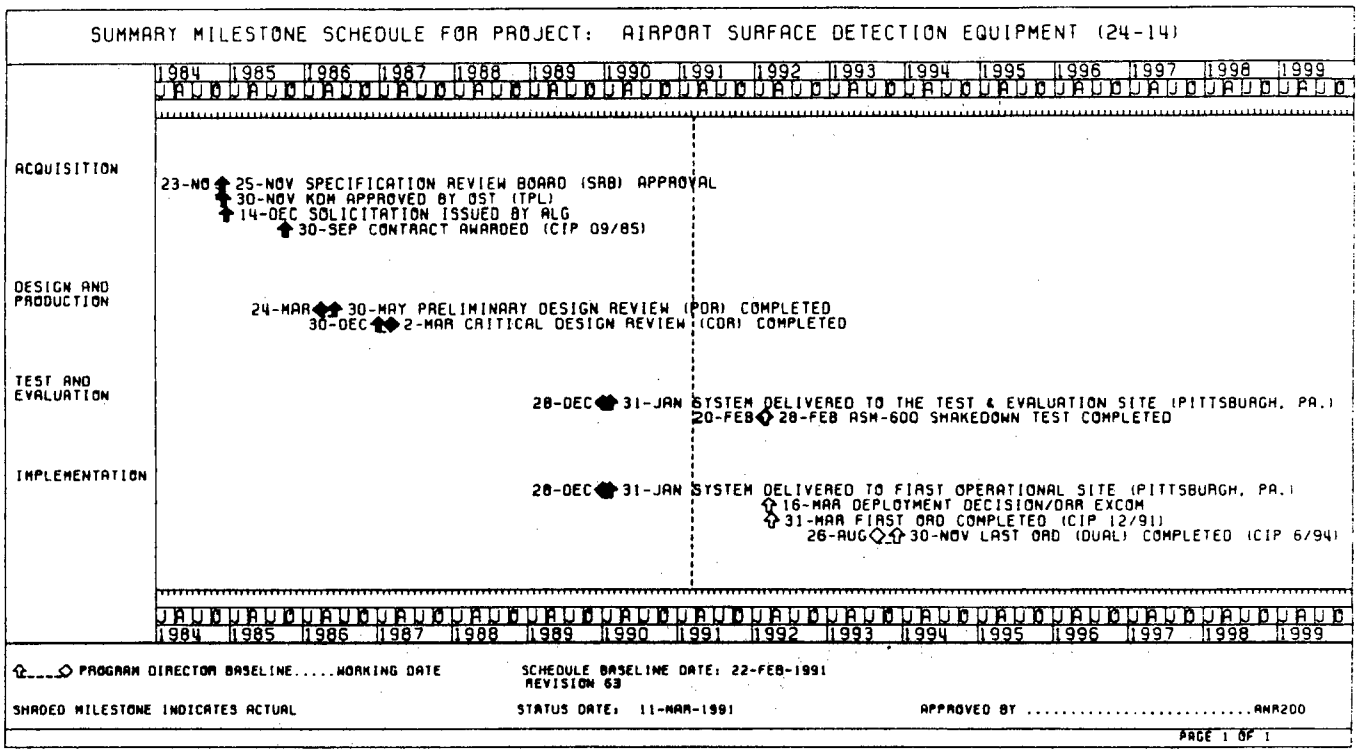
*** The Denver ASDE-3 system delivery will be delayed until 03/31/93 to coincide with the delivery of the system to the "New Denver" airport. The FAA Tech Center will receive the scheduled Denver system in May 1991. It is the intention of the FAA to modify the ASDE-3 contract to replace the Denver system for full mosaic operation.

**** Display size to be changed from 14" to 17" at Regional request.

TABLE 4-2. ASDE-3 Milestone Description Report

DESCRIPTION	EARLY FINISH	BASELINE FINISH	ACTUAL FINISH
SPECIFICATION REVIEW BOARD (SRB) APPROVAL	23-NOV-84	25-NOV-84	25-NOV-84
KDM APPROVED BY OST (TPL)	30-NOV-84	30-NOV-84	30-NOV-84
SOLICITATION ISSUED BY ALG	14-DEC-84	14-DEC-84	14-DEC-84
CONTRACT AWARDED (CIP 09/85)	30-SEP-85	30-SEP-85	30-SEP-85
PRELIMINARY DESIGN REVIEW (PDR) COMPLETED	24-MAR-86	30-MAY-86	24-MAR-86
CRITICAL DESIGN REVIEW (CDR) COMPLETED	2-MAR-87	30-DEC-86	2-MAR-87
SYSTEM DELIVERED TO FIRST OPERATIONAL SITE (PITTSBURGH, PA)	28-DEC-89	31-JAN-90	28-DEC-89
SYSTEM DELIVERED TO THE TEST & EVALUATION SITE (PITTSBURGH, PA)	28-DEC-89	31-JAN-90	28-DEC-89
ASM-600 SHAKEDOWN TEST COMPLETED	20-FEB-92	28-FEB-92	
DEPLOYMENT DECISION/DRR EXCOM	16-MAR-92	16-MAR-92	
FIRST ORD COMPLETED (CIP 12/91)	31-MAR-92	31-MAR-92	
LAST ORD (DUAL) COMPLETED (CIP 06/94)	26-AUG-93	30-NOV-93	

FIGURE 4-1. ASDE-3 Milestone Schedule



CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. The ASDE-3 program is under the auspices of the Program Director for Surveillance, ANR-1. The program manager (PM) and designated staff members are responsible for procurement and implementation of the ASDE-3 from contract award through installation, checkout, and integration into the NAS. Matrix management will be used by the PM, who is the single focal point for all program activities, to monitor specific areas such as contractor performance and program implementation. The PM will utilize personnel from various FAA organizations to support program requirements within the guidelines provided by FAA policies, procedures, and directives. While there will be distinct lines of authority with regard to achieving program goals, informal communication and support among program responsible personnel will play a vital part in achieving the successful implementation of the ASDE-3.

a. Key Individuals. Key individuals associated with the ASDE-3 program are as follows:

(1) PM. The Program Director for Surveillance (ANR-1) has designated ANR-200, to serve as PM for the ASDE-3 program.

(2) Technical Officer (TO). The PM has designated a member of ANR-120, as TO for the ASDE-3 contract. The TO will be responsible for all technical aspects of design, production, testing, delivery, and management of the ASDE-3 turnkey installations. The TO is also responsible for all aspects of field implementation and will maintain close liaison with the regional Technical Onsite Representative (TOR) and the contractor's installation teams in the regions by providing technical guidance and direction within the scope of the contract.

(3) Quality Reliability Officer (QRO). A QRO is appointed by the FAA Logistics Service Industrial Division, ALG-400, to administer the contract at the contractor's factory and ensure the adequacy of the quality control programs and inspection system.

(4) TOR. The TOR is designated by the regional Airway Facilities (AF) Division to ensure that activities required to support of the installation of the ASDE-3 are accomplished in an orderly manner. The TOR is responsible for communication, coordination, and reaction to the responsibilities of the TO. The TOR will submit periodic technical reports to the TO describing progress at each site within the region.

(5) Airway Facilities Site Representative (AFSR). The AFSR is assigned by the regional AF division manager with primary responsibilities to work closely with the TOR, the contractor and AF sector personnel during the installation, and acceptance phases at each ASDE-3 site.

(6) Test Director (TD). The TD is appointed by the Engineering, Test and Evaluation Service (Communications/ Navigation/Surveillance Division, ACN-200) to coordinate all phases of Government testing, develop Operational Test and Evaluation (OT&E) and NAS integration test plans and procedures, and direct the conduct these tests.

b. ASDE-3 Program Responsibilities.

(1) Headquarters Responsibilities.

(a) Program Manager for Terminal Radar (ANR-200).

1 Provide program guidance to all offices, services, the Aeronautical Center and the regions.

2 Ensure the timely implementation of the ASDE-3 into the operational environment in a way that minimizes costs and optimizes systems performance.

3 Identify ANR requirements and staff offices of services necessary to support the installation and test efforts of the ASDE-3.

4 Prepare, analyze, and distribute scheduling information to regions, the Aeronautical Center, FAA Technical Center, etc.

5 Ensure the baseline configuration for the ASDE-3 and provide suitable documentation to appropriate offices upon transition to operational status.

6 Provide planning and guidance information to all activities which interface with the ASDE-3 for the timely implementation of support activity.

7 Provide site preparation requirements to the regions and FAA Technical Center (ACT), for monitoring the accomplishment of site activities leading toward the completion and acceptance of the site installations.

8 Be responsible for factory and field acceptance testing.

9 Provide technical oversight and/or direction to the contractor in the design, development, production, testing, installation, integration and documentation of hardware and software for the ASDE-3.

10 Develop the ASDE-3 maintenance concept which entails providing for maintenance of the ASDE-3 by the appropriate in-house services and coordination with Maintenance Engineering Division, ASM-100.

11 Coordinate with the region(s) for scheduling and monitoring installation, dismantling, or disposal of equipment in accordance with Order 4800.2, Utilization and Disposal of Excess and Surplus Property.

12 Ensure the availability of all software and hardware interfaces required for ASDE-3 implementation.

13 Ensure the availability of an ASDE-3 shakedown test plan and procedure.

14 Develop the Letter of Agreement (LOA) as per Order 6090.1, Development and Implementation of Remote Monitoring Subsystem (RMS) within the National Airspace System NAS for the ASDE-3 RMS.

15 Ensure the availability of funds and keep the contract within budget limitations.

16 Determine distribution of ASDE-3 documentation.

17 Ensure logistic support requirements in coordination with the Aeronautical Center are planned, funded, and delivered in time to permit effective operational use of the ASDE-3.

18 Provide input and assistance to the Office of Training and Higher Education (AHT) for training of maintenance personnel.

19 Ensure the development of performance, maintenance, and calibration standards and procedures for the ASDE-3.

20 Assist in, and ensure the development of, system operational changeover plans with Air Traffic Plans and Requirement Service (ATR) and the regions.

21 Provide configuration management support for the ASDE-3 via the Configuration Control Board (CCB) and ASDE-3 Program Planning Groups.

22 Resolve all issues emanating from installation, checkout, and integration into the NAS of the ASDE-3.

23 The TO will schedule meetings for all TOR's to provide briefings on the TOR's responsibilities and authority.

(b) Office of the Associate Administrator for Air Traffic (AAT).

1 Identify and document any additional operational requirements for the ASDE-3 and update Order 7110.65, Air Traffic Control Handbook, to include air traffic procedures for integration of the ASDE-3 into the NAS.

2 Ensure that all operational aspects of system implementation are satisfactorily resolved by the regions prior to operational changeover.

3 Assist in the development of ASDE-3 shakedown and changeover plans with Radar Engineering Branch, ASM-630, and regions.

4 Provide technical coordination and support to ANR-120 on items associated with air traffic control (ATC) functions, hardware configurations, and operational requirements for interfacing with external Air Traffic (AT) systems.

5 Support ASM-630 in the area of ATC operational computer programs and site map generation.

6 Provide membership to the ASDE-3 CCB and Planning Group.

7 Provide AHT with any special training requirements for facility personnel and specialists assigned to regions or sites, and the National Terminal Data Systems Branch at the FAA Technical Center.

(c) FAA Logistics Center (ALG-300/400).

1 Provide procurement actions necessary to award and administer contract(s) for the acquisition of the ASDE-3 and related items to include, but not be limited to, spares and support equipment (e.g., electrical power plants).

2 Provide FAA headquarters and in-plant contract administration. The headquarters contract office has been designated as, Systems Development Branch, ALG-320.

3 Provide in-plant QRO's to ensure the adequacy of the quality programs and inspection systems, and to administer the contract at the contractor's factories.

4 Provide surveillance of program management and contract administration.

5 Provide policy and procedural guidance to regional AF divisions and the Mike Monroney Aeronautical Center for appropriate ASDE-3 property controls and record maintenance prior to operational use.

6 Provide procedural guidance for the disposal or utilization of surplus material.

7 Provide support to the ASDE-3 CCB and Planning Group.

(d) Office of Training and Higher Education (AHT). Act as alternate contracting officer's technical representative for training items only (AHT-400, FAA headquarters).

(e) Configuration Management and Engineering Support Division (ASE-600). Set the policies for how to control the changes in the configuration of the ASDE-3 and monitor the ASDE-3 configuration. Changes will be evaluated and controlled by the CCB.

(2) System Engineering and Integration (SEI) Contractor Responsibilities.

(a) Provide direct support to the Surveillance and Weather Systems Branch (ACN-230) at the FAA Technical Center, to include, but not be limited to, the following areas:

1 ASDE-3 PIP development.

2 ASDE-3 Deployment Readiness Review (DRR) checklist development and coordination.

3 ASDE-3 contractor developed documentation review, as assigned.

(3) Region Responsibilities. The regions will assist the TO with ASDE-3 program coordination, monitoring and approving contract installation and checkout efforts for the ASDE-3 field implementation to include, but not limited to, subparagraph 71(b). Regional AF division managers are the responsible individuals for the ASDE-3 implementation. To assist in this effort, each AF division manager will designate a TOR, and be responsible for the assignment of an AFSR.

(4) ASDE-3 Contractor Responsibilities. The ASDE-3 contractor is responsible for providing turnkey ASDE-3 installation. This includes design, development, testing, production, and installation of the system and providing spares, unique test equipment, training and all required documentation, as defined in paragraphs 71a and 80-83.

(5) Mike Monroney Aeronautical Center (AAC) Responsibilities. AAC will provide maintenance material, maintenance training support, and inputs to the maintenance concept in coordination with the FAA Academy, FAA Logistics Centers and ANR-120. The Aeronautical Center will be provided with one ASDE-3 subsystem. It will be used by the FAA Academy for training, by the FAA Logistics Center, and by ASM-630 for program support. Responsible organizations for each task listed in subparagraphs (a) - (n) are in parentheses following the task description.

(a) Provide maintenance support for the ASDE-3 to include tools and test equipment, support equipment, facilities, technical data, transportation and handling. (AAC-400).

(b) Act as contracting officer's technical representative for training items only. This task is assigned to the supervisor, Enroute Radar Unit, AAC-944C, FAA Academy (AAC-944).

(c) Analyze training requirements, approve training program/materials, assign training responsibility, review and approve all associated ASDE-3 training schedules, assignments, and programs (AAC-940).

(d) Establish contractor conducted training programs for maintenance personnel (AAC-940).

(e) Instruct and advise regions on training programs, schedules, and personnel assignments using Order 1380.40, Airway Facilities Sector Level Staffing Standard System, for guidance with manning standards established by the Maintenance Operations Division, ASM-200 (AAC-940).

(f) Provide for technical supervision of onsite activities performed under the contract(s) at the FAA Academy (AAC-440).

(g) Accept items delivered to the FAA Academy under the ASDE-3 contract (AAC-52).

(h) Conduct provisioning conferences for the ASDE-3 program (AAC-400).

(i) Develop, in conjunction with ALG and ANR, logistics policies and plans for support of the ASDE-3 (AAC-400).

(j) Participate, as requested by ANR, in the review of instruction books developed by the contractors (AAC-400, AAC-940).

(k) Assure timely selections of necessary maintenance instructors to meet AAC training and staffing requirements (AAC-940).

(l) Participate in planning activities for the transition of the ASDE-3 into the logistics inventory (AAC-400).

(m) Provide facilities for contractor training of FAA personnel (AAC-940).

(n) Establish facilities and item management control and accountability for all agency property received at the Aeronautical Center (AAC-80).

(6) FAA Technical Center. The Surveillance and Weather Systems Branch (ACN-230) will provide the ASDE-3 PM with the following support.

(a) Provide support to the ASDE-3 CCB and Planning Group.

(b) Provide technical support in ASDE-3 contract monitoring.

(c) Monitor the installation and checkout of the first ASDE-3 system.

(d) Support NAS integration testing on the first ASDE-3 system and provide support to the PM for all phases of test and evaluation.

(e) Support the development of test policy, standards, and test requirements.

(f) Support the accomplishment of a valid test program by reviewing conformity of test programs with Order 1810.4, FAA NAS Test and Evaluation Program, by review test of plans, test procedures, monitoring tests, and reviewing test analysis and reports.

(g) Support the program manager in the preparation of test plans, procedures, and reports.

(h) Support all testing activities up to first-site commissioning, and additional sites as required.

(i) Provide a recommendation based on test results in support of the EXCOM DRR process to determine whether the ASDE-3 system should or should not be deployed.

(7) National Airway Engineering Field Support Sector (ASM-600). The Radar Engineering Branch, ASM-630, is responsible for providing ASDE-3 support to the regions and operational facilities as follows:

(a) Develop ASDE-3 shakedown test plan and procedures.

(b) Provide engineering field support.

(c) Develop hardware/software performance, maintenance, and calibration standards and procedures for the ASDE-3.

(d) Provide engineering support on all ASDE-3 software and hardware interfaces.

(e) Assist in the development of the Letter of Agreement (LOA) as per Order 6090.1, Development and Implementation of Remote Monitoring Subsystems (RMS) within the National Airspace System (NAS) for the ASDE-3 RMS.

51. PROJECT CONTACTS. The primary points of contact for the ASDE-3 program are shown in Table 5-1, ASDE-3 Project Contact List.

52. PROJECT COORDINATION. The following subparagraphs provide a brief overview of program support groups and their responsibilities to assist the TO in fulfilling assigned activities.

a. TOR. The TOR's serve as focal points in the respective regions for the ASDE-3 implementation activities. As the PM's regional representatives, they work closely with the PM and the headquarters TO. They are designated by the regional AF division manager and are accountable for ensuring that the ASDE-3 is implemented in an orderly manner. TOR's tasks include, but are not limited to, the following:

(1) Coordinate/manage regional deployment activities.

(2) Provide guidance and direction to the FAA site personnel.

(3) Provide inputs and periodic technical reports describing the deployment progress at each site to the TO.

(4) Coordinate with Air Traffic as required, for test activities associated with the operational ATC systems.

(5) Notify the JAI Board Chairman of JAI readiness and conduct integration of the ASDE-3 into the NAS (reference Order 6030.45, Facility Reference Data File) and ensure the airway facilities sector manager or appropriate representatives are present.

(6) Review and approve contractor's Site Engineering Report (SER).

(7) Confirm radar operating frequencies of each installation site to the TO. Frequency assignments will be forwarded to the contractor.

TABLE 5-1. ASDE-3 Project Contact List

	OFFICE	INDIVIDUAL	TELEPHONE
PROJECT AREA			
Program Director	ANR-1	C. Weigel	202-267-3203
Program Manager	ANR-200	G. J. Taylor	202-267-8713
Contract Administrator	ALG-320	N. Greenfelder	202-267-3657
Technical Officer	ANR-120	P. Leman	202-267-8428
Air Traffic	ATR-120	A. Oltman	202-267-9176
Field Support	ASM-630	B. Garnett	FTS-747-4271
QRO	ALG-422	W. Grimes	516-845-2210
FAA Academy Training	AAC-944A	D. Brown	FTS-747-4496
FAA Depot Provisioning	AAC-485A	A. Fergus O'Brian	FTS-747-4840
RMMS	ANA-160	B. Pamer	202-646-5846
Engineer Support	DTS-53	J. Fantasia	FTS-837-2855
Test Director	ACN-230	L. Dvorsky	FTS-482-5319
REGION			
Alaskan	AAL-450	B. Bransky	907-271-5351
Central	ACE-425	L. Jones	816-587-2706
Eastern	AEA-432	A. Arbeiter	718-667-1109
Great Lakes	AGL-430	C. Pere	312-694-7656
New England	ANE-420	W. Tretter	617-273-7211
Northwest Mountain	ANM-422	D. Curran	206-431-2426
Southern	ASO-432	J. Garrett	404-644-2684
Southwest	ASW-421	R. Clark	817-624-5425
Western Pacific	AWP-422	D. Hedani	213-297-1078
Aeronautical Center	AAC-445B	S. Babb	FTS-747-5240
NON-FAA			
Reliability	RADC/IITRI	E. Bolden	703-920-0144
Contractor, Proj. Mgr.	NORDEN	D. Nussbaum	516-845-2418

(8) Arrange for contractor site access.

(9) Complete FAA Form 256, Inspection Report of Material or Services, for the ASDE-3 system through line 24 and sign the `inspected by' block and submit the completed form to the TO who signs block 25 to accept the system.

(10) Maintain installation logs and submit installation status reports, based on log entries, to the TO.

b. Site Representative. The FAA site representatives (AFSR) will be assigned by the AF division manager. This position will be the interface between the contractor, TOR and sector personnel. Tasks include, but are not limited to, the following:

(1) Assist the contractor during site surveys.

(2) Provide inputs to the TOR and logistics planning activities as they relate to site requirements.

(3) Record site performance data prior to beginning the installation.

(4) Provide assistance to the TOR in direction and guidance to the contractor to efficiently and timely accomplish site preparation, installation, testing, and evaluation for the ASDE-3.

(5) Witness the site preparation and installation.

(6) Participate in testing and integration into NAS.

(7) Witness the completion of FAA Form 256 for ASDE-3 acceptance.

(8) Assist in system field testing in accordance with the requirements of the test plans for the ASDE-3.

(9) Participate in the JAI.

c. CCB. In accordance with Order 1800.8E, NAS Configuration Management, the CCB is the official agency-authorized forum to approve or disapprove baselines and changes to the baselines. There is a central NAS CCB to establish and

control baselines and to administer configuration control. From this CCB, authority is delegated to lower level CCB's to effectively administer proposed changes at the most appropriate level. All lower level CCB's will be accountable to the NAS CCB which has been established through a charter defining its authority, responsibilities (including the specific documents over which the CCB has control), and membership. Decisions and directions are documented in Configuration Control Decisions (CCD), which either approves, disapproves, defers, or refers the change request to another CCB. When contractual action is required, the CCD serves as a basis for the preparation of a procurement request which is submitted to the contracting officer. The CCD may also be distributed to other Government agencies and serves as an official notification of CCB action. Representatives on the CCB are to include the various agency services/offices that have responsibilities to acquire, support, and operate the system. Other representatives may be invited to attend as required.

(1) ASDE-3 CCB Membership (see table 5-2).

(a) Air Traffic Plans and Requirements (ATR).

(b) Surveillance Engineering Division (ANR).

(c) FAA Technical Center.

1 ACN-230 (Prime)
2 SEI (Support)

(d) NAS System Engineering Service (ASE-600).

(e) FAA Logistics Center (AAC).

53. PROJECT RESPONSIBILITY MATRIX. The ASDE-3 Project Responsibility Matrix is shown in table 5-2.

54. PROJECT MANAGERIAL COMMUNICATIONS. To maintain effective and responsible control of overall ASDE-3 progress, and reviews, conferences and working sessions will be held among the TO, TOR's, and the contractor. Participation in these conferences and working groups by various FAA offices will be requested at the discretion of the TO. In addition, routine status reports will be required.

TABLE 5-2. ASDE-3 Project Responsibility Matrix

TASK/PLAN/ACTIVITY	PRIMARY OFFICE	SUPPORTING OFFICE
Project Management and Control	ASDE-3 Program Manager	ALL
NAS Implementation of ASDE-3	ANR-120, Regions, Contractor	FAA, SEI, ACT
Financial Management	ANR-120	Regions
Record Form 198 Data	Site Representative	TOR, ANR-120
Site Selection	Regions	Regions
Installation of ASDE-3	Contractor	Regions, ANR-120
Site Survey	Contractor	Regions, ANR-120
Acceptance Test/Joint Acceptance Inspection (JAI)	Contractor, TOR, Site Representative, ACN-230	ANR-120, AAT
System Integration/Testing	ACN-230, TOR, Site Representative, ATCT Personnel, Contractor	ANR-120, AAT
System Shakedown Testing	ASM-630, ANR-120	AAT, ACT, Regions
Site Specific Map Generation	ASM-630	ANR-120, Regions
Maintenance Staffing	ASM-200	ANR-120, Regions
RMS	ANR-120, ANA-160	SEI, ACT
Maintenance Training	AAC-944A	AHT, ANR-120, Regions
Configuration Management	ASE-600, ANR-120, ASM-100	AAT, ACT, SEI, ALG
Operational Integration	AAT, ANR-100	Regions, ASM-630, ACN-230
Contract Administration	ALG-300	ANR-120, Regions, AAT
Technical (overall)	ANR-120	ALL
Technical (Field)	Regions, ACN-230, AAC ASM-630	ASM-100, SEI
Logistic Support	AAC, ALG-300, ANR-120 Contractor	ASM-100, SEI

55. IMPLEMENTATION STAFFING. The following personnel are responsible for the implementation of the ASDE-3 program.

a. PM. The Program Director for Surveillance (ANR-1), has designated ANR-200 to serve as PM for the ASDE-3 program.

b. TO. The PM has designated a member of ANR-120 as TO for the ASDE-3 contract. The TO will be responsible for all aspects of design, production, testing, delivery, installation, NAS integration and management of the ASDE-3 turnkey contract. The TO is also responsible for all aspects of field implementation and will maintain close liaison with regional TOR's and contractor's installation teams in the regions.

c. QRO. A QRO is appointed by Logistics Service, (ALG-300), to administer the contract at the contractor's factory and ensure the adequacy of the quality control programs and inspection system.

d. TOR. The TOR is designated by the regional AF division to ensure that activities required in support of the ASDE-3 installation are accomplished in an orderly manner. The TOR is responsible for communication and coordination, in support to the responsibilities of the TO. The TOR will submit weekly technical reports to the TO describing progress in each site within the region.

e. Test Director (TD). The TD is appointed by the Engineering, Test and Evaluation Service (Communications/ Navigation/Surveillance Division, ACN-200) to coordinate all phases of Government testing, develops operational test and evaluation (OT&E) and NAS Integration Test Plans and Procedures, and directs the conduct of the above tests.

56. PLANNING AND REPORTS. The successful implementation of the ASDE-3 program will be monitored by the use of the following:

a. Program Status Review Boards. The PM will brief higher level management on the status of program schedules, cost information, and technical topics. These reviews provide for top-level management control of the program. The PM may request the support of functional or contractor organizations in providing status and information on specific program topics.

b. Contractor Progress Reports. Monthly, the contractor will apprise the FAA of their assessment of contractual effort as of the date of the report, work scheduled for the next period, and special problem areas including proposed solution.

c. Configuration Control and Status Accounting Report. Provide data needed to identify configuration identification and determine the status of change proposals, deviations and waivers, including implementation status.

d. Implementation Working Group. This group will meet periodically at FAA headquarters in Washington, D.C., or other agreed to locations to address both program issues and specific functional activities. Membership consists of the PM and the headquarters TO. Other offices will be asked to participate as required. Action items generated at these meetings will be resolved by the program office or representatives from functional areas. Minutes of each meeting will be distributed to attendees and include a summary of the topics discussed and description of all action items/resolutions.

e. TOR's. These conferences will be scheduled as necessary. These meetings are attended by TOR's from each Region, the TO, and representatives from headquarters organizations. The conferences provide a forum to discuss and resolve program issues of special interest to the regions. Action items generated at these conferences focus on regional concerns and are resolved by the TO and designated TOR's or representatives from functional areas.

f. Design Reviews. Design reviews between ANR-120 and the ASDE-3 contractor will be held at scheduled times. These reviews include the Preliminary Design Review (PDR), and a Critical Design Review (CDR), which have been completed. Other project design reviews addressing specific ASDE-3 activities are being convened on a monthly basis. Participating organizations will be notified in advance on the date, time, and location by the PM. ANR-120 may be represented by the technical officer.

g. Regional Status Reporting. Weekly status reports regarding technical progress will be submitted to the TO by each TOR. Routine reporting, as well as responses to specific issues/requests, will be addressed in these reports.

h. Quality and Reliability. The contractor's facility QRO will develop weekly reports to the ANR-120 TO. Format, content and schedule of these inputs are as directed by the ANR-120 TO.

i. Installation Phase Documentation. The basic documentation required are the installation log and weekly installation status reports. These are described as follows:

(1) Installation Log. The FAA site representative will maintain a project log and make entries documenting the installation status, activities, and events for each site. Entries will be made for every visit to the site and/or communication/coordination with the contractor's onsite representative that have an impact on the contract. Items of consequence not adequately covered by written documents shall be included in the log (e.g., unusual physical conditions encountered, oral protests, design deficiencies noted and actions taken, cause and extent of delays, etc.). The complete and factual entries will be made at the time of occurrence. Upon completion of the contracted work, the site representative will forward the log to the TO.

(2) Weekly Installation Status Reports. These reports are designed to ensure that the Contracting Officer, regional divisions, and the PM are abreast of the progress and/or problems each week at each location. The weekly status report will be prepared and distributed by the TOR. Weekly status reports will be supplied to the site representative and the regional AF division and AF sector managers, as a minimum.

57. APPLICABLE DOCUMENTS.

a. FAA Documents

FAA-C-2454	Facility Site Preparation
FAA-G-1210	Provisioning Technical Documentation
FAA-G-1375B	Spare Parts Peculiar
FAA-E-2552A	Technical Training
NAS-DD-1000A	NAS Level I Design Document
NAS-SS-1000	NAS System Specification, Volumes I and III
FAA-STD-019	Lightning Protection for Facilities
FAA-STD-036	Preparation of Project Implementation Plans
DTFA01-85-C-00054	Award/Contract for ASDE-3
FAA-E-2725a	Specification for ASDE-3
NAS-MD-790	RMMS Interface Control Document
ATC-85-0084	NAS Transition Plan, Volumes I & II
--	NAS Program Master Baseline Schedules
--	Capital Investment Plan, Facilities, Equipment, and Associated Development
--	Subsystem Training Plan for ASDE-3
--	NAILS Integrated Logistics Support Plan for ASDE-3

b. FAA Orders.

1050.1	Policies and Procedures for Considering Environmental Impacts
1050.10	Prevention, Control and Abatement of Environmental Pollution of FAA Facilities
1320.1	FAA Directives System
1380.40	Airway Facilities Sector Level Staffing Standard System
1800.8	NAS Configuration Management
1800.58	National Airspace Integrated Logistic Support Policy
1800.63	NAS Deployment Readiness Review Program
1810.4	FAA NAS Test and Evaluation Program
4250.9	Field Inventory Management and Replenishment Handbook
4402.55	FAA Procurement Manual-Real Property
4620.3	Initial Support for New or Modified Equipment Installation
4650.7	Management of Project Material
4800.2	Utilization and Disposal of Excess and Surplus Property
4800.6	Delegation of Disposal Authority for Personal Property
6030.45	Facility Reference Data File
6090.1	Development and Implementation of Remote Monitoring Subsystems (RMS) Within the National Airspace System (NAS)
6330.3	Maintenance of Airport Surface Detection Equipment (ASDE-3) Facilities
7032.5	ASDE-3 Air Traffic Service Operational Requirements
7110.65	Air Traffic Control Handbook

58.-59. RESERVED

CHAPTER 6. PROJECT FUNDING

60. PROJECT FUNDING STATUS, GENERAL. FAA offices, services, and regions must use the budgeting process to obtain funding for staffing, training, equipment, and associated development. ANR-200 is the sole source of funding to the regions for the ASDE-3 program. The ASDE-3 program is currently within budget for the items specified in the ASDE-3 specification, FAA-E-2725a, as provided for in the ASDE-3 Award/Contract, DTFA01-85-C-00054.

61.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS. The ASDE-3 program includes turnkey installation by the contractor. As such, the contractor is responsible for the design, manufacturing, testing, and delivery of the ASDE-3 subsystem to all field sites. The contractor is also responsible for conducting necessary site surveys, equipment installation, and testing of the integrated ASDE-3 which includes the conduct of installation and checkout and interfacing with the NAS. Prior to the physical deployment of ASDE-3 equipment to the first three sites, as a minimum, the FAA program office will be required to conduct a DRR. DRR's will be conducted in accordance with Order 1800.63, NAS Deployment Readiness Review. The DRR process should begin approximately 180 days prior to the applicable deployment dates shown in table 4-1, ASDE-3 Equipment Delivery Report.

71. SITE PREPARATION. The requirements for ASDE-3 site preparation are as specified and shall be in accordance with section 5.0 of FAA-E-2725b. The site preparation for the ASDE-3 installation falls into two categories: contractor site preparation responsibilities and FAA site preparation responsibilities. Also, the FAA site preparation requirements are identified in the ASDE-3 contract in order to clearly delineate the installation responsibilities with the ASDE-3 turnkey contractor. The contract-specified Government activities for ASDE-3 turnkey installation are, unless otherwise stated, FAA-regional responsibilities. These Government/regional responsibilities are specified in Part I-Section H, Special Contract Requirements, of DTFA01-85-C-00054, Page 73 and as revised by Modification Number 16 to the contract.

a. Contractor Responsibilities. For each location identified by the FAA, the contractor shall perform a site survey and evaluation to obtain specific site information required for installation of the ASDE-3. The site specific data will be documented in a SER and is subject to FAA approval.

(1) Perform a pre-delivery site survey to evaluate site specific information, identify space allocation and ASDE-3 equipment location. Survey plant electrical service, telco cable connection, and environmental conditions.

(2) Produce a site survey that provides a record of survey findings and engineering evaluation of plan for installation of ASDE-3 system plus projected system onsite performance.

(3) Responsible for the transportation and delivery of the ASDE-3 equipment including delivery of onsite spare modules.

(4) Physical installation of the ASDE-3 hardware.

(5) Installation of the set of onsite spare modules into ASDE-3 system after power-on, but prior to performance of onsite acceptance tests. Modules thereby removed become the set of onsite spare modules.

(6) Erection of the remote self-supporting tower. This includes soil bearing tests, tower footings, tower erection, installation of obstruction lights and air terminals (lighting rods), and termination of electric service, telco lines, and fiber optic cable.

(7) Tune up the ASDE-3 system and performance of the onsite acceptance test.

b. FAA Responsibilities. FAA site preparation responsibilities are specified in Part I- Section H, Special Contract Requirements, of DTFA01-85-C-00054, Page 73. Some of the FAA's major responsibilities are described in the following subparagraphs (1) through (7).

(1) FAA-Regional Responsibilities in Site Selection. The regional office is responsible for the selection of the ASDE site and in the evaluation of those factors that will determine ASDE performance from the selected site. The basic selection should determine whether the ASDE site should be:

(a) LTC Configuration, wherein the ASDE rotodome is installed atop the ATCT.

(b) RT Configuration, wherein the rotodome is mounted on a self-supported tower.

(c) Mosaicked Configuration, wherein the radar video from two or more radar sensors of the LTC or RT configuration, are combined by a single Display Processor Subsystem.

Regional site selection and the evaluation and determination of the appropriate ASDE configuration should be based upon achieving optimum compliance with Order 7032.5, Airport Surface Detection Equipment (ASDE-3) Air Traffic Service Operational Requirements. Generally, this should be achieved in the LTC configuration as the ASDE-3 criteria for visibility of airport movement areas is identical to that of the local and ground air traffic controllers and achieves a similar degree of compliance to the requirements specified in Order 6480.4, Airport Traffic Control Tower Siting Criteria. Additionally, the ASDE-3 site location must not be in violation of the FAR Part 77 parameters which would represent a hazard to flight.

(2) Fixed Target Reflectors. Regional action should select the number (minimum of four) and location of fixed target reflectors to be located on the airport surface. Fixed target reflectors are passive dihedral reflectors (essentially an angle bracket with 8cm x 8cm sides) mounted on a frangible pole whose maximum height will not exceed 8 feet. These reflectors provide map registration reference points, adaptive STC reference points (automatic receiver compensation for weather conditions), and monitoring and calibration of system coverage. Airport size and runway configuration determines the number of reflectors (typically four). Location on the airport surface is not critical except in providing a fiduciary mark for alignment of the digitally generated maps. The reflector must be located in a sterile clutter area (e.g., a flat surface with a radius of 40 feet) in order to avoid vegetation reflections that would corrupt the reflector's calibrated radar signal return. Two to five foot height is the normal optimum reflector position.

(3) Support Items. Additional support items that regional action should provide the ASDE-3 turnkey contractor are as follows:

(a) ATCT Modifications. The FAA shall reinforce and modify as necessary all ATCT cab roofs to accommodate installation of the antenna as specified in paragraph 71b(5). Some towers will require extensive modifications in order to accommodate the ASDE-3 equipment located in the tower shaft.

Space must be made available and suitable environmentally controlled equipment rooms provided prior to delivery. The FAA will identify all locations scheduled for ATCT cab roof installations.

(b) Configuration. The FAA will identify the ASDE configuration including the number of RT's, if any, to be installed by the contractor at each location.

(c) FAA TOR. The FAA will designate an individual to represent the FAA during the installation process at a designated airport. The TOR shall be the point-of-contact and coordinate all onsite activities between the turnkey contractor, the Airport Manager and Air Traffic personnel.

(d) Equipment Locations. The FAA will identify specific locations for the installation of all deliverable equipment. This includes the ATCT operations area, equipment room, and the remote towers.

(e) "Right-of-Way". Arrangements for right-of-way for access roads, power, telephone lines, and signal, data and control cables will be made by the FAA. The contractor shall provide specification for the number and size of cableways, ducts, and information needed by the FAA to complete the civil and mechanical engineering design for each installation.

(f) Airport Drawings. The FAA will provide four sets of drawings depicting the current airport layout, the current ATCT configuration including power and telephone service availability, and the new equipment (ASDE-3) locations. In addition, the FAA will provide four sets of drawings depicting any RT tower installations.

(g) Obsolete Equipment Disposal. Disposal of all equipment removed during the replacement process will be the responsibility of the FAA.

(h) Repairs. Any repairs to the ATCT that are necessary and become evident after removal of the old equipment shall be made by the FAA.

(i) Commissioning Inspection. A commissioning inspection of each system will be conducted by the FAA.

(j) RT. RT locations will be selected by the FAA. Primary power, telephone service, and monitor and control cables will be installed on the airport by the FAA in accordance with paragraphs 5.3 to 5.3.2.4.8 of FAA-E-2725a.

(4) Regional Responsibilities in Implementation of an LTC. The FAA regional responsibilities in the implementation of an ASDE-3 local tower configuration are as follows:

(a) Removal and disposal of ASDE-2 antenna and electronics equipments is a regional responsibility (Reference Contract Modification Number 016).

NOTE: ASDE-2 equipment has been submitted as a candidate for disposal under the FAA Special Disposal Authority Procedures of Order 4800.6.

(b) Refurbish ATCT roof in those instances where the ASDE-2 radome is removed and thereby exposes additional areas of roof to weather conditions.

(c) Relocate communication and other antennas from ATCT cab roof.

NOTE: Engineering tests will be performed to investigate the potential placement of antennas at roof edge sectors where ASDE coverage is non-critical.

(5) Civil Construction Modifications required of ATCT. The civil construction modifications required to adapt the ATCT's for ASDE-3 installation are the responsibility of the FAA region. The modifications that normally will be required are as follows:

(a) Modify rooftop to provide a structure that will support the ASDE-3 antenna pedestal assembly and provide a mating footprint.

NOTE: The ASDE-3 pedestal is a quadruped whose legs are 60 inches long for optimum load transfer across the rooftop to the cab mullions. Mounting adapters at the end of each quadruped leg will adjust the mounting for either box beam or I-beam attachment.

(b) Provide space allocation for ASDE-3 electronic equipment including adequate space for regionally selected optional add-on modules; e.g., mosaic unit, additional display processor units.

(c) Provide electrical power service, three phase commercial power service with engine generator backup.

NOTE: Rotodome heater/utility power is separate from the ASDE system power feeder and may be placed on a noncritical power buss.

(d) Provide telco/intercom service lines that include a 2400 baud line for Remote Maintenance Monitoring System (RMMS) interface.

(e) Allocate space allocation within the ATC operational cab for display units and for control panels. Determine placement and/or location of display units and control units within ATC cab. Provide electrical service, single phase 117 volts, for these operational displays. Provide overhead tracks or console mounting hardware as appropriate. Identify route through or around the ATC cab for waveguide that will connect from ASDE antenna to ASDE electronics located within the equipment room.

NOTE: If the ATC tower configuration permits, placement of the ASDE-3 T/R's cabinets above the cab in order to eliminate waveguide's transit through the cab is acceptable.

(6) Regional Responsibilities in Implementation of Remote Tower. The FAA regional responsibilities in the implementation of a remote tower configuration ASDE are as follows:

(a) Site selection for erection of a self-supported ASDE tower is a regional responsibility. The site selected for a tower with a height of 90 to 150 feet must comply with the FAR Part 77 criteria and not create a hazard to flight. Lease arrangements, easements, and construction permits as appropriate will be a Regional responsibility.

(b) Access road and parking area adjacent to the selected remote tower site will be a Regional responsibility.

(c) Provide electrical power service, three-phase commercial power service with engine generator backup.

NOTE: Rotodome heater/utility power is separate from the ASDE system power feeder and may be placed on a noncritical power buss.

(d) Radar cable: The ASDE-3 contractor will provide the necessary length of fiber-optic radar cable as determined in the SER. The region is responsible for installation of the fiber optic cable from the ATCT equipment room to the base of the remote tower. A slack loop shall be left at both ends for ASDE-3 contractor action in its termination.

(e) Telephone communication lines shall be furnished for intercom and for ASDE control. A control cable for telephone and/or intercom use shall be provided by the region to enable voice communications between the equipment room and the remote tower and also for ASDE-RMS subsystem interconnection, a minimum of two telco lines. Interface with the RMM may require a separate 2400-baud telco line.

(f) The region shall insure that the ASDE-3 installation contractor provides and installs obstruction lights for the self-supporting tower and also ensure the adequacy of such temporary obstruction lights during the tower erection process.

(7) Schedule of Site Preparation. The sequence of site preparation activities and the schedule for completion of these activities is the responsibility of the FAA region. Those activities that involve the ASDE-3 contractor (e.g., site evaluation report, SER) shall be accomplished in a coordinated effort with the ANR-200 ASDE program office.

72. DELIVERY. As stated in paragraph 70, General Deployment Aspects, the contractor is responsible for providing all equipment, material, and personnel for delivery. The delivery schedule for the ASDE-3 is depicted in table 4-1. All site preparation activities shall be completed prior to the ASDE-3 delivery dates. Reference section 5.0 of FAA-E-2725a.

73. INSTALLATION PLAN. The contractor shall ensure the installation of each applicable ASDE-3 item described in paragraph 3 of this order in accordance with section 5.3 of FAA-E-2725a. All equipment shall be installed in accordance with the contractor developed, FAA-approved, installation procedure as contained in section 9 of the Hardware Instruction Book, paragraph 3.21.3. This handbook shall include all information, schematics, and drawings necessary to install, tuneup, and checkout the ASDE subsystem. A FAA-approved draft manuscript, per section 9 of the Hardware Instruction Book, shall define the installation, integration, and checkout material as contained in the hardware instruction book, and will be used and verified during the installation of the first system. The approved final document shall be the installation standard for all ASDE-3 installations.

74.-79. RESERVED.

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION. The contractor portion of the ASDE-3 verification and testing will be conducted in phases; each phase is designed to provide increased assurance that required system objectives are being met. Verification will begin with Development Test and Evaluation (DT&E) and shall be complete upon the satisfactory verification of required system performance during in-plant acceptance testing and onsite Field Test and Evaluation (FT&E). The ASDE-3 verification and testing phases are as follows:

a. Phase IA, Developmental Test and Evaluation, in plant.

b. Phase IB, FT&E, at the field T&E selected by the FAA.

c. Phase II, in-plant testing; Production Acceptance Test and Evaluation (PAT&E) on an ASDE-3 production Unit for requirements verification prior to delivery, installation, and onsite testing.

(1) Test Plan. The contractor has developed and the FAA has approved the ASDE-3 Test Plan as required by the ASDE-3 contract number DTFA01-85-C-00054. The plan defines the verification phases and how individual procedures will also be developed and approved to verify the requirements of ASDE-3 specification, FAA-E-2725a. The ASDE-3 test program comprises Phase 1A, DT&E phase, Phase 1B, FT&E phase, and Phase II, PAT&E phase. In addition, the test program requires reliability growth testing for 1,000 hours to rapidly mature the system design, the FCC type acceptance of the design to demonstrate electromagnetic compatibility with the operating environment. The software testing requirements of FAA-E-2725a, paragraphs 3.21.5.5 and 3.21.5.6 are described in the contractor developed and FAA-approved Software Test Plan and test procedures.

(2) Design Identification Matrix. The ASDE-3 Test Plan also contains the design certification matrix required by FAA-E-2725a, paragraph 3.21.8. This matrix provides a functional decomposition of the ASDE-3 specification requirements, which associated each specification paragraph with the method of verification. In the case of verification by test, the particular contractor test procedure that will demonstrate compliance in accordance with FAA-E-2725a, section 4.0, is also

indicated. In the case of verification by analyses or data, the matrix delineates the contract or specification reference that requires or permits the verification to be performed by analysis or data submittal. Verifications by inspection will be performed by in-process inspection. All other references are to specification paragraphs; these are either not quantitative, do not require verification, or are not qualitatively verifiable.

(3) Test and Verification Documentation. The contractor will be responsible for the development of and obtaining FAA approval for the following ASDE-3 test and verification documentation.

(a) Software Test Plans and Procedures.

(b) ASDE-3 Test Plan.

(c) Test procedures for design qualification, Phase IA, DT&E, in-Plant.

(d) Test procedures for design qualification, Phase IB, FT&E.

(e) Test procedures for type tests.

(f) Test procedures for production tests, in-plant.

(g) Test procedures for production test, delivery, installation and onsite test.

81. CHECKOUT. This is the first stage of onsite testing and is performed by the contractor on an ASDE-3 subsystem level basis only. Checkout testing verifies the hardware system integrity of the contractor-delivered equipment prior to interfacing with any site equipment. These tests will usually consist of alignment, correct display presentation, voltage and signal checks at all external output points, and checks for grounds or short conditions at all external input points to ensure that interface to external equipment are appropriate.

82. CONTRACTOR INTEGRATION TESTING. The contractor shall perform the ASDE-3 integration testing using FAA approved procedures and checklists for all site adaptation and integration activities. Contractor integration testing will subject the ASDE-3 to the test site and live air traffic control environments. This testing will verify the integrated functional areas within the complete system, as well as the ASDE-3 in a site specific environment. Testing will be conducted using live inputs and recorded or simulated inputs as necessary for the verification of the ASDE-3 in an operational environment.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). Upon completion of contractor integration testing (ref. paragraph 82) the CAI will be conducted by the TOR. The contractor is to have demonstrated that the system has complied with all technical and functional requirements of onsite and operable. The completion of CAI designates acceptance of the equipment by the FAA.

84. OPERATIONAL AND NAS INTEGRATION TESTING. Operational and NAS integration testing will be conducted to verify the NAS system level and operational requirements using live and/or simulated data and/or interfaces. Based upon the availability of these data/interfaces, this could be a one time test. ACN-200 is the office of primary responsibility for Operational and NAS integration testing. ASDE-3 Operational and NAS Integration Testing will include, as a minimum, running diagnostics, interface tests with appropriate RMMS equipment, loading of site operational software and running of test procedures to verify the system-level and operational requirements as defined in NAS Requirements NAS-SR-1000, and NAS Specification NAS-SS-1000. ACN-230 is responsible for the preparation and availability of the ASDE-3 Operational Test and Evaluation/Integration Test Plan and the support test procedures.

85. SHAKEDOWN AND CHANGEOVER. Shakedown testing is the final stage of operational test and evaluation. The goal of shakedown testing is the exercising and T&E of a system in an operational environment to support the determination that the system is ready for full operation as part of the NAS. This includes T&E to confirm that when the system is operated and maintained by operational personnel in an operational environment, all requirements are met. Shakedown testing should reflect the operational readiness of people, procedures, and the system to assume field operational status. JAI is a subset of shakedown testing. Results from shakedown testing and JAI support the DRR decision. The DRR decision is made for the first operational

site, while shakedown testing would apply to all sites. Prior to the JAI the TOR will verify that:

a. That the ASDE-3 turnkey contractor has completed the delivery, installation, and test requirements as described in ASDE-3 Acceptance Data Package, including completion of FAA Form 256.

b. Spares are available at the site, in the required range and depth, to support the site's operational schedule.

c. Adequate sector maintenance personnel have completed the ASDE-3 Training Course and demonstrated proficiency in the equipment.

86. JOINT ACCEPTANCE INSPECTION (JAI). A JAI shall be conducted in accordance with Order 6030.45, Facility Reference Data File. The purpose of JAI is to ensure that each ASDE-3 meets specified requirements for operation, maintenance, and has demonstrated that the facility is ready to be commissioned. The Joint acceptance Board may include representatives from: ANR, regional offices, Air Traffic headquarters, sites and other representatives as appropriate. A copy of the results of the JAI must be forwarded to the TO for submission to the PM. The JAI documentation is comprised of FAA Forms 6030.18 through 6030.25 and the data contained therein. The ASDE-3 will be designated as operationally certified upon the satisfactory completion of the JAI.

87.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT. In compliance with the 90's maintenance policy, the ASDE-3 will be supported by two levels of maintenance-site and depot. In addition, the status of the ASDE-3 will be monitored by the ASDE-3 RMS subsystem and subsequently reported by data link to the RMMS located in an Area Control Facility (ACF) or Air Route Traffic Control Center (ARTCC). After receipt of an alarm from the RMMS, a technician will be dispatched to the ASDE-3 facility to repair the fault causing condition. The technician will complete the repair and return with the faulty Line Replaceable Unit (LRU). After returning to his/her work center with the faulty LRU, the technician will forward the LRU to the depot level of maintenance for disposition. For more specific detail about paragraphs 90-94, users should refer to the Integrated Logistics Support Plan (ILSP) for the ASDE-3. The ASDE-3 ILSP describes the Integrated Logistics Support (ILS) planned for the ASDE-3. The plan defines the responsibilities, management, maintenance requirements, and a description of the ILS support elements.

91. TRAINING. The ASDE-3 training will be developed and administered in accordance with the Technical Training specification, FAA-E-2552A, and as presented in the Subsystem Training Plan. It presents training planning information, including training requirements and schedules, for the ASDE-3 program and is a communication coordination document containing planning data requiring FAA review, modification, and approval. This plan contributes to planning, managing, developing, and transitioning and site-specific design training developed by the SEI contractor. Revisions to the ASDE-3 training plan will be made as required by changes in program projections and actual project events. A quick reference listing is shown, for information purposes only, in Figure 9-1, Training Data Base Example for the ASDE-3. The training data base is updated as required and maintained in Washington, D.C., by the SEI (Logicon).

92. SUPPORT TOOLS AND TEST EQUIPMENT. Refer to section 5.0 of the Integrated Logistics Support Plan for the ASDE-3.

93. SUPPLY SUPPORT. Refer to section 4.0, Supply Support of the Integrated Logistics Support Plan, for the ASDE-3.

94. VENDOR DATA AND TECHNICAL MANUALS. Refer to section 10.0 of the Integrated Logistics Support Plan for the ASDE-3.

FIGURE 9-1. Training Data Base Example for the ASDE-3

08/21/90
14:12:52

RECORD NO. : 58
LAST UPDATE : 08/21/90

TRAINING DATA BASE

PROJECT NAME : ASDE-3
SMART SHEET # : 4140
SEIC TNG MGR : FURTEK, 646-5428
AHT-400 MGR : MAY
ASM-210 MGR : PADILLA
AAT-14 MGR : ACOSTA, 267-9210
TRNG SPEC : 2552A

BROWN BOOK# : 4-14
CURRENT STP : 05/01/87
TNG P.R. COMPL : 09/30/85
AT T.P. COMPL : 06/07/85
CONTRACT DATE : 09/30/85
PDR DATE : 05/30/86
CDR DATE : 03/02/87

FAA PROGRAM MANAGER: G.J. TAYLOR, ANR-200, 267-8713
CONTRACTING OFFICER: NANCY GREENFELDER, ALG-320, 267-3657
SEIC PROGRAM MANAGER: N/A
ACAD.TNG.MGR. (COTR) AF: D. BROWN, FTS-747-5268
ACAD.TNG.MGR. (COTR) AT: RUSS DAVOREN, FTS-747-5977

PROJECT CONTRACTOR : NORDEN
CONTRACTOR TRNG REP: TBD,

OF SITES IMPACTED: 29 # OF SYSTEMS PROCURED: 30
FIRST INSTALLATION LOCATION: PITTSBURGH, PA DATE : 12/31/89
TEST LOCATION: PITTSBURGH, PA START: 12/31/89 COMPL: 12/30/91
LAST SITE COMMISSIONED: 08/30/93
DATE EQUIP DELIVERED TO ACADEMY: 06/30/91 TURNKEY DAYS: 104
AF TPR ACAD: 3 TC: 0 FIELD: 93 TOT: 96
AT TPR ACAD: 0 TC: 0 FIELD: 1578 TOT: 1578

NO OF CONTRACTOR COURSES: 1 CLASSES: 3 CONTR TPR: 19
CONTRACTOR TRAINING STARTS: 04/16/90 ENDS: 09/30/92
LOCATION OF CONTRACTOR CLASSROOM TRAINING: PITTSBURGH
LOCATION OF CONTRACTOR HANDS ON TRAINING: PITTSBURGH

AF JTA ?:YES DATE: 07/22/88 AT JTA ?:NO DATE: N/A
AF CTP ?:YES DATE: 09/11/88 AT CTP ?:NO DATE: N/A
AF CBI ?:NO DATE: N/A AT CBI ?:NO DATE: N/A

IS A PROPOSED TRAINING SCHEDULE IN THE TDB ?: YES

DATE AF TRAINING IS ASSUMED BY THE FAA: 10/31/92
DATE AT TRAINING IS ASSUMED BY THE FAA: 10/31/91
METHOD AF: CR/HO AT: CR/OJT

SYSTEM PRINCIPLES EXAM #:TBD DATE AVAIL: 06/30/88
PERFORMANCE EXAMINATION #: NO DATE AVAIL: N/A

AIRPORT SURFACE DETECTION EQUIPMENT - 3.
No AT training in contract. FAA Academy will develop trng materials. AF training provided for in contract. Contractor will conduct one class at Pittsburgh and two classes at the FAA Academy. Three techs per site. plus Logistics Center and Academy personnel.

95. EQUIPMENT REMOVAL. The FAA is responsible for the disposal of all equipment removed during the replacement process. Disposition of equipment removed prior to or during installation shall be in accordance with Order 4800.2A, Property Utilization and Disposal of Excess and Surplus Personal Property. The ASDE-2 equipment has been submitted as a candidate for disposal under the FAA Special Disposal Authority Procedures of Order 4800.6.

96. FACILITIES. For those sites receiving the ASDE-3 ATCT Standard Configuration, the FAA is responsible for any reinforcement and any modification required to the ATCT cab roofs to accommodate the ASDE-3 antenna installation. Facility modification/transition will be addressed in more specific detail in the appropriate Regional Facility Transition Plans.

97.-99. RESERVED.

APPENDIX 1. ACRONYMS

AAC	Mike Monroney Aeronautical Center
AAT	Office of the Associate Administrator for Air Traffic
ACF	Area Control Facility
ACN	Engineering Test and Evaluation Service
ACO	Administrative Contracting Officer
ACT	FAA Technical Center
ACU	Antenna Control Unit
AF	Airway Facilities Division
AFSO	Airway Facilities Sector Office
AFSFO	Airway Facilities Sector Field Office
AFSR	Airway Facilities Site Representative
AGC	Automatic Gain Control
AHT	Office of Training and Higher Education
ALG	FAA Logistics Service
AND	Office of the Associate Administrator for NAS Development
ANR	Program Director for Surveillance
ARTEMIS	An automated planning and scheduling tool
ASDE	Airport Surface Detection Equipment
ASE	NAS System Engineering Service
ASM	Systems Maintenance Service

AT	Air Traffic
ATC	Air Traffic Control
ATCT	Air Traffic Control Tower
ATR	Air Traffic Plans and Requirements Service
A/C	Aircraft
BRITE	Brite Radar Indicator Tower Equipment
CAI	Contractors Acceptance Inspection
CCA	Circuit Card Assembly
CCB	Configuration Control Board
CCD	Configuration Control Decisions
CCP	Cab Control Panel
CDR	Critical Design Review
cm	Centimeter
CPCI	Computer Program Configured Item
DPIC	Display Processor Interface Control
DPU	Display Processor Unit
DRR	Deployment Readiness Review
DT&E	Development Test and Evaluation
FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulations
FT&E	Field Test and Evaluation

ICD	Interface Control Document
ILS	Instrument Landing System/Integrated Logistic Support
ILSMT	Integrated Logistic Support Management Team
ILSP	Integrated Logistic Support Plan
ISP	Integrated Support Plan
JAI	Joint Acceptance Inspection
LOA	Letter of Agreement
LRU	Line Replaceable Unit
LTC	Local Tower Cab
MPS	Maintenance Processor System
MPU	Map Preparation Unit
MTBF	Mean Time Between Failure
NAILS	National Airspace Integrated Logistics Support
NAILSMT	National Airspace Integrated Logistics Support Management Team
NAS	National Airspace System
OS	Operating System
OT&E	Operational Test and Evaluation

PAT&E	Production Acceptance Test and Evaluation
PDR	Preliminary Design Review
PIP	Project Implementation Plan
PL/M	Program Language for Microprocessors
PM	Program Manager
PPI	Plan Position Indicator
PRF	Pulse Repetition Frequency
PRR	Pulse Repetition Rate
PT	Portable Terminal
PVD	Plan View Display
QRO	Quality Reliability Officer
RCJB	Radar Cable Junction Box
RF	Radiofrequency
RMMS	Remote Maintenance Monitoring System
RMS	Remote Maintenance Subsystem
RMSC	Remote Monitoring Subsystem Concentrator
ROTODOME	Combined Antenna and Radome that rotates as a unit and is symmetrical about its rotation axis
RT	Remote Tower
RTC	Remote Tower Configuration

SCP	System Control Panel
SDLC	Synchronous Data Link Control
SEI	System Engineering and Integration
SER	Site Engineering Report
STC	Sensitivity Time Constant
TBD	To Be Determined
TO	Technical Officer
TOR	Technical Onsite Representative
TSC	Transportation Systems Center
TV	Television
T/R	Transmitter/Receiver